

USER'S MANUAL

MODEL: 5403EG-20 (Air Cooled)

MODEL: 5403EG-50 (Water Cooled)

76MM ELECTROMAGNET

Date Sold: _____

Serial number: _____

PROPRIETARY

THIS DOCUMENT CONTAINS CONFIDENTIAL INFORMATION
PROPRIETARY TO GMW ASSOCIATES. IT MUST NOT BE
REPRODUCED OR DISCLOSED TO OTHERS OR USED IN ANY
WAY EXCEPT FOR THE INSTALLATION, OPERATION OR
MAINTENANCE OF GMW ASSOCIATES PRODUCTS.

TABLE OF CONTENTS

SPECIFICATIONS	Section 1
Table 1 Model 5403EG-20 General Specifications	
Table 1 Model 5403EG-50 General Specifications	
Table 2 Model 5403EG Electrical and Water Connections	
 WARNINGS [Refer to this section before operation of Electromagnet]	Section 2
 INSTALLATION	Section 3
Minimum Facility Requirements, and Equipment Checklist	
Unpacking Instructions	
Mounting Position	
Pole Installation and Setting Pole Gap	
Electrical Circuit	
Interlocks	
Cooling	
 OPERATION	Section 4
General	
Calibration	
Field Control Operation	
 MAINTENANCE	Section 5
 STANDARD OPTIONS	Section 6
Motorized Rotating Drive	
Probe Holder	
 CUSTOM OPTIONS	Section 7
Horizontal Mount	
 EXCITATION CURVES	Section 8
 TEST DATA	Section 9
 DRAWINGS	Section 10
Elmwood 3450 Thermostats	
Drawing 11901050 5403EG-20 Electromagnet General Assembly	Continued...

DRAWINGS

Drawing 11901080 5403EG-50 Electromagnet General Assembly
Drawing 11901070 5403/P62B-4075 Electromagnet Electrical Assembly
Drawing 13900430 5403/ P62B-4075 Electromagnet Electrical Wiring
Drawing 11900740 5403/P62B-3066 Electromagnet Electrical Assembly
Drawing 13900240 5403/P62B-3066 Electromagnet Electrical Wiring
Drawing 11900240 5403/BOP20-40 Electromagnet Electrical Assembly
Drawing 13900110 5403/BOP20-40 Electromagnet Electrical Wiring
Drawing 13900090 5403/BOP20-20/20-20 Power Supply Electrical Wiring
Drawing 11901180 5403 Electromagnet to Rolling/Rotating Base Assembly
Drawing 11901160 5403 Electromagnet to Rolling Base Assembly
Drawing 11901170 5403 Electromagnet to Rotating Base Assembly
Drawing 11901190 5403 Electromagnet Assembly to Vertical Mount
Drawing 11803430 Rolling/Rotating Base Assembly
Drawing 11803170 Rolling Base Assembly
Drawing 11802090 Rotating Base Assembly
Drawing 17901610 5403 Electromagnet Vertical Mount Bracket
Drawing 17901450 5403 Electromagnet Angle Bracket
Drawing 11901140 5403 Cooling System
Drawing 18900000 Electromagnet Tool Kit
Drawing 17901390 Pole, Cylindrical (76mm)
Drawing 17901400 Pole Spacer
Drawing 17901470 Pole Retainer
Drawing 18800282 Shipping Crate Assembly

Section 1
SPECIFICATIONS

Table 1. Model 5403EG-20 Specifications

Pole Diameter:	76mm (3 inch)
Pole Gap: [fixed, adjustable with spacers]	40mm (1.6 inch) minimum 150mm (5.9 inch) maximum
Standard Pole Face:	76mm (3 inch) cylindrical 38mm (1.5 inch) tapered
Coils (series connection)	
coil resistance (20°C)	0.45 Ohm
max resistance (hot)*	0.55 Ohm
max power (continuous)	20A/10V (0.20kW)
max power (peak)	75A/40V (3.0kW)
duty cycle (at peak power)	5%, 20 sec max on
Self Inductance	60mH
Overtemperature Interlock	Elmwood 3450G thermostat part number 3450G 611-1 L50C 89/16 mounted on each coil and wired in series. Contact rating 120Vac,0.5A. Closed below 50°C.
Dimensions	Drawing 11901050 582mm W x 270mm D x 359mm H 22.9 inch W x 10.6 inch D x 14.1 inch H
Weight	135 kg (297 lb)

***CAUTION - The value of maximum coil resistance given should not be exceeded. At this resistance the coils are at maximum safe temperature for continuous operation.**

Section 1
SPECIFICATIONS

Table 1. Model 5403EG-50 Specifications

Pole Diameter:	76mm (3 inch)
Pole Gap: [fixed, adjustable with spacers]	40mm (1.6 inch) minimum 130mm (5.1 inch) maximum
Standard Pole Face:	76mm (3 inch) cylindrical 38mm (1.5 inch) tapered
Coils (series connection)	
coil resistance (20°C)	0.45 Ohm
max resistance (hot)*	0.55 Ohm
max power (continuous, air cooled)	20A/10V (0.20kW)
max power (continuous, water cooled)	50A/25V (1.25kW)
max power (peak)	75A/40V (3.0kW)
duty cycle(at peak power)	30%, 120 sec max on
Self Inductance	60mH
Water Cooling (18°C)	2 liters/m (0.5 US gpm) 0.8 bar (12 psid)
Overtemperature interlock	Elmwood 3450G thermostat part number 3450G 611-1 L50C 89/16 mounted on each coil and wired in series. Contact rating 120Vac,0.5A. Closed below 50°C.
Dimensions	Drawing 11901080 582mm W x 282mm D x 359mm H 22.9 inch W x 11.1 inch D x 14.1 inch H
Weight	141 kg (310 lb)

***CAUTION - The value of maximum coil resistance given should not be exceeded. At this resistance the coils are at maximum safe temperature for continuous operation.**

Section 1

SPECIFICATIONS

Table 2. Model 5403EG Electrical and Water Connections

DC Current (as seen from the front refer to Drawing 11901050/11901080)

Right hand terminal:	Negative
Left hand terminal:	Positive

Ground

An M6 screw (Item 16 on drawing 11901050/11901080) is inside the terminal cover to enable the magnet frame to be grounded according to local safety regulations. It is normally appropriate to connect the magnet frame to the power supply ground.

Interlocks (refer to Drawing 11901050/11901080).

The temperature interlock wiring connections are made directly onto the temperature thermostats (Item 10 on drawing 11901050/11901080).

Water (refer to Drawing 11901080 5403EG-50 only).

Outlet	1/8 inch NPT
Inlet	1/8 inch NPT

(mating couplings for 6mm [1/4 inch] hose provided)

CAUTION - Ensure that the high current connections are tight. Loose connections may lead to oxidation and overheating. The field stability may be degraded and the current terminations damaged.

Section 2

WARNINGS

REFER TO WARNINGS BELOW BEFORE OPERATING ELECTROMAGNET

1 Personnel Safety

In operation the magnet fringing field is in excess of 0.5mT (5G). This can cause malfunctioning of heart pacemakers and other medical implants. We recommend that the fringing field should be mapped and warning signs be placed outside the 0.5mT (5G) contour. Entry to this region should be restricted to qualified personnel.

3 Ferromagnetic Objects

During operation the magnet exerts strong magnetic attraction towards ferromagnetic objects in the near vicinity of the pole gap or coils. Loose objects can be accelerated to sufficient velocity to cause severe personnel injury or damage to the coils or precision pole faces if struck. Keep ferromagnetic tools clear!

4 Arcing

This magnet stores considerable energy in its field during operation. Do not disconnect any current lead while under load or the magnetic field energy will be discharged across the interruption causing hazardous arcing.

5 Coil Hot Resistance

Do not exceed the maximum coil hot resistance given in the specifications or coil overheating and possible damage may occur.

6 Interlocks

These should *always* be connected if the magnet is operated unattended, to avoid the possibility of coil overheating caused by excessive power dissipation or inadequate cooling.

7 Watches, Credit Cards, and Magnetic Disks

Do not move magnetically sensitive items into the close vicinity of the magnet. Even some anti-magnetic watches can be damaged when placed in close proximity to the pole gaps during operation. Credit cards, and magnetic disks are affected by magnetic fields as low as 0.5mT (5G). Depending on the previous operating field and the pole gap, the remanent field in the gap can be in excess of 50G (5mT) with the magnet power supply off or disconnected.

Section 3

INSTALLATION

Minimum Facility Requirements for Bipolar and Unipolar Systems installed in North America

Floor Space:

Magnet floor area: 604 x 270mm

Total Mass: 141kg (310lb)

Power Supply & Rack floor area: 700 x 900mm

Total Mass: 100kg (220lb)

An area for access to the Magnet and Power Supply must be provided. The total area for the system and comfortable operation is about 2 x 2m (6 x 6ft). The area should be clean and free from obstructions.

Electrical Service:

	Bipolar System	Unipolar System
MPS Power: Power Supply: Voltage: Current: Power Cable: Mains Outlet: Mating Plug:	2 x Kepco 20-20M 115Vac, Single Phase 50 – 60Hz 11A / Supply (22 Amps Total) Provided with Power Supply Nema 5-15R (US Standard) Or 6-15R if used with GMW Rack Provided with Power Supply	1 x Power10 P62B-3066 190 – 253Vac, Single Phase 50 – 60Hz 20 Amps 3 Conductor, 12AWG Min. Nema L6-20R or equivalent Nema L6-20P or equivalent
Auxiliary Power for Rack: Voltage: Current: Plug: Mating Receptacle:	115Vac, Single Phase 30A Nema L5-30P Nema L5-30R	115Vac, Single Phase 15A Nema 5-15P Nema 5-15R

Note: Due to liability and insurance reasons, the mains power installation and connections for the Unipolar system must be completed by the facility electrician.

Water Cooling:

Water Temperature: 18°C

Flow Rate: 2 liters / minute

Pressure: 0.5 bar (8 PSID)

Water Hose: 6mm I.D., rubber, 2 x 5m long minimum

Plumbing Fittings: To connect 6mm hose to water source and drain. (It is recommended to have a water filter to trap debris on the facility water source and shutoff valves on the water source and drain.)

System Computer (if not provided by GMW):

Processor: Intel Pentium III, 500MHz PC or better

Memory: 128MB RAM

Free Drive Space: 500MB

Interface: IEEE-488 (GIPB)

Monitor Resolution: 1024 x 768 or better

Operating System: Windows ME / 2000 / XP pro / NT4

Lifting Equipment for Installation:

Forktruck or other lifting device with minimum safe lifting capacity of 250kg

Nylon Slings with minimum safe lifting capacity of 250kg

Section 3

INSTALLATION

Model 5403 System Installation; Equipment Check List

General:

Please provide this manual to the person who will be responsible for the System installation. If you need to discuss details of the installation please call GMW. If a GMW Engineer is to supervise the installation any delays caused by inadequate preparation may result in additional charges for Engineering Time.

Site:

☐ Floor space and work space cleared and ready for equipment.

☐ Appropriate electrical services installed

Materials Required:

☐ Power Plugs

☐ Power Cable

☐ Cooling water supply installed with shut-off valves

Materials Required:

☐ 6mm I.D. water hose, 5m for source and 5m for drain.

☐ Water hose fittings appropriate for installed plumbing.

☐ Water hose clamps.

Section 3

INSTALLATION

Caution: This is a heavy system. All movement, lifting and installation of the 5403EG Electromagnet must be under the supervision of an experienced person to prevent the possibility of serious injury or damage to the Electromagnet and associated equipment.

Unpacking Instructions and Damage Inspection

To unpack the electromagnet please use the following procedure (Refer to Drawing 18800282).

1. First remove all of the "Hex Head Screws" located at the lower edge of all the side panels of the "Crate Top Cover".
2. Gently rock the "Crate Top Cover" to work it loose from the shipping crate base.
3. Grip the side panels of the Crate Top Cover. Lift "Crate Top Cover" high enough to clear top of electromagnet, walk cover sideways to a clear area and place on floor.
4. Inspect the magnet to ensure that no damage has occurred to the magnet in shipment. If damage is evident report the damage in detail to the shipper for claim and simultaneously notify GMW in case assessment of the damage must be made. If no damage is found proceed with magnet unpacking and installation.
5. Remove the M12 Hex Head Coach Bolts that secure the magnet to the shipping crate base".
6. Install M10 lifting eye and washer to top of magnet yoke, screw down firmly.
7. The magnet is now prepared for final installation. Follow the appropriate procedure for direct or base mounting listed below.

Direct Mounting

1. With suitable lifting equipment e.g. 250kg (550 lb) minimum safe lifting rating, lift magnet 50mm (2") clear of shipping crate base.
2. Slide shipping crate base clear.
3. Lower magnet to 50mm (2") above floor.
4. Move magnet to final location and bolt magnet down through the four mounting holes provided in the magnet angle bracket (Item 8 on drawing 11901050/11901080).

Section 3

INSTALLATION

Pole Installation and Setting Pole Gap (Refer to drawing 11901050 for the Model: 5403EG-20 (air cooled) and drawing no11901080 for the 5403EG-50 (water cooled))

Using the field uniformity and induction curves determine the most desirable pole; cylindrical or tapered. In general:

If a uniform field is required use a cylindrical pole.

If a high field is required use a tapered pole.

Pole removal (Refer to drawing 11901050/11901080).

1. Turn off the power supply.
2. Loosen and remove the four pole retaining bolts and washers (item 12 & 18 on drawing 11901050/11901080).
3. Remove the pole taking care that the pole face is not damaged by contacting the magnet yoke.
4. Repeat this operation for the other pole.

Pole fitting (Refer to drawing 11901050/11901080).

1. Ensure the poles and pole sleeves are clean and free from debris.
2. Slide on a pole spacer of the appropriate thickness to achieve the desired pole gap.
3. Reverse the above pole removal sequence above.

Electrical Circuit

Never connect or remove cables from the magnet with the power supply connected. The stored energy in the magnet can cause arcing resulting in severe injury to personnel or equipment damage.

The magnet has two coils which are connected in series, (Refer to drawing 11901050/11901080). The power supply cables should be connected directly to the dc current terminals marked + and -. Recommended current cable for the 5403EG is stranded copper of 16mm² cross section (4 AWG).

Because the magnet stores a significant amount of energy in its magnetic field, special care should be taken to insure that the current terminations are secure and cannot work loose in operation. Local heating at the terminations can cause rapid oxidation leading to a high contact resistance and high power dissipation at the terminals. If left unattended this can cause enough local heating to damage the terminals and the coils.

The 5403EG Interlocks

The Model 5403EG has two thermostats, Elmwood 3450G Part Number 3450G611-1 L50C 89/16. They are located at the center of the coil between the DC terminals and wired in series. The thermostats are normally closed, opening when the coil central cooling plate temperature exceeds 50°C +/3°C.

Section 3

INSTALLATION

Cooling

The Model 5403EG-20/5403EG-50 can be operated to an average coil temperature of 70°C. Assuming an ambient laboratory temperature of 20°C and a temperature coefficient of resistivity for copper of 0.0039/°C, the hot resistance of the coil should not exceed 20% more than the ambient temperature "cold" resistance. The coil thermostat will open when either coil temperature exceeds 50°C

During operation the resistance can be checked using a voltmeter across each coil. The voltage will rise to a constant value once thermal equilibrium has been reached. If it is desired to save water, the flow can be reduced until the hot resistance is approached. NOTE: This adjustment must be made slowly enough to allow for the thermal inertia of the coils.

5403EG-50 [with water cooling]

The cooling copper tubes are electrically isolated from the coils to avoid electrochemical corrosion. A 50 micron filter should be placed before the input to the magnet to trap particulates and avoid unreliable operation of the water flow switch interlock if fitted.

For continuous operation of the magnet it may be appropriate to use a recirculating chiller to reduce water and drainage costs. The chiller capacity will depend on whether cooling is required for the magnet alone or magnet and power supply. For the model 5403EG-50 electromagnet alone a suitable chiller is the Bay Voltex Model: Mercury MC-50-E1-H1 with Flow Switch and Particle Filter Options.

For recirculating cooling systems use distilled or deionized water with a biocide to prevent bacterial growth and corrosion. Do not use corrosion inhibitors in high quality electrical systems since the water conductivity is increased which can result in increased leakage currents and electrochemical corrosion.

OPERATION

General

The magnet operates as a conventional electromagnet.

1. Set the poles to the desired gap using the appropriate thickness Pole Spacer (item 4 drawings no 11901050/11901080). Use equal spacers on each pole to maintain the pole faces symmetrical about the magnet center line. The minimum gap with standard poles is 40mm.
2. Turn on the power supply and increase the current until the desired field is reached.

Calibration

The induction curves may be used to estimate the field in the air gap to within four or five percent. More accurate field determination may be obtained by deriving experimentally a calibration curve for the particular pole and air gap combination being used. Magnetic hysteresis in the yoke and poles can cause an error of 30 to 70G (3 to 7mT) with an arbitrary application of such a calibration curve. This effect may be reduced to less than one percent by following a prescribed 'current setting schedule' designed to make the magnet 'forget' its prior magnetic history. The schedule should of course be used both in establishing the calibration curve and in its subsequent use. A possible schedule would be:

From zero current, increase to maximum current and reduce again to zero current. Increase again to maximum current and reduce to the current to give the desired field setting. Approaching the desired field from a higher setting will typically produce better field uniformity. This is because the field changes at the pole edges will normally lag the field change at the center thereby helping to compensate the radial decrease in field.

Greater precision in setting up the calibration curve will be achieved with the use of a digital teslameter and by making a numerical table. This table used with an interpolation routine will eliminate the error associated with reading a graph.

In any event, three points need to be remembered:

1. A calibration curve or table is only as good as the precision employed in generating it.
2. The field is defined only at the point it is measured. It will generally be different at a different point in the air gap. For example, the induction curves refer to the field on the pole axis and at the center of the air gap (median plane).
3. The field is most directly a function of the current in the magnet coils. Voltage across the coils is not a good measure of field since the electrical resistance of the coils depends on the temperature (about 0.4% per degree celsius).

OPERATION

Field Control Operation

The necessity to use calibration curves can be avoided by using a field controller to sense the magnetic field and provide a corresponding power supply control signal through the power supply programming inputs. Contact GMW for suitable instrumentation.

Section 5

MAINTENANCE

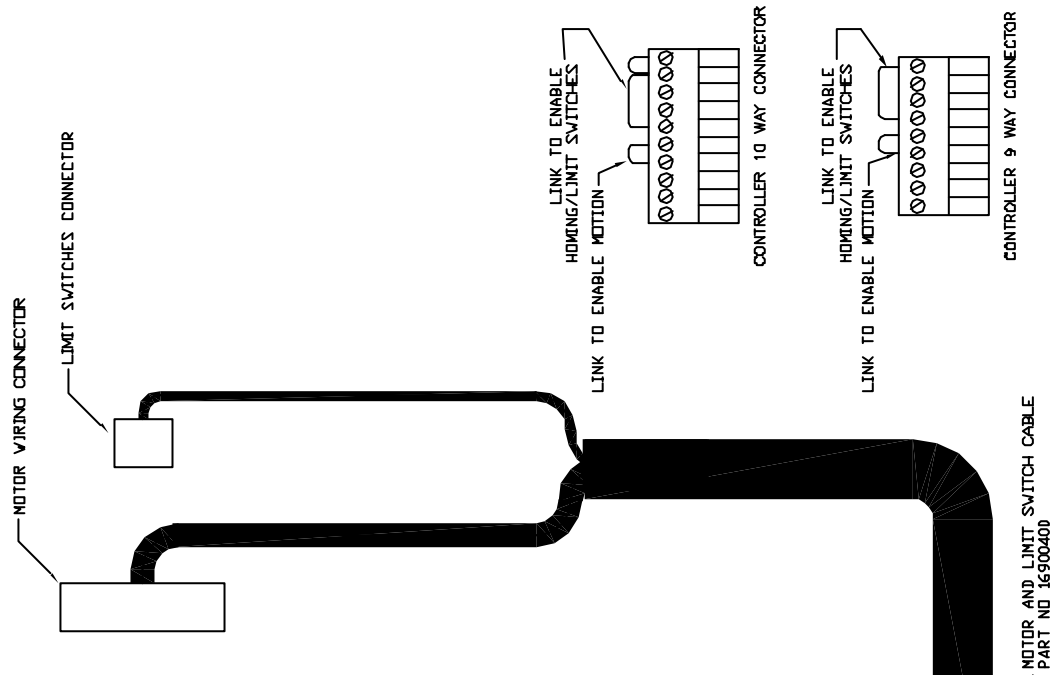
Note that the surface treatments used provide good corrosion protection but in order to maintain the inherent mechanical precision of the magnet, heavy build-up of plating materials is deliberately avoided. As a result, high humidity, operation with cooling water at an inlet temperature below the dew point, or otherwise seriously corrosive atmospheres can cause corrosion. Periodically apply an appropriate corrosion protection, particularly when the magnet is stored for an extended period.

Be very careful not to damage the relatively soft pole surfaces since this may degrade the magnetic field uniformity in the gap.

Section 6

STANDARD OPTIONS

MODEL 3474	MRD:	SEE	DWG	NO:	11900810
MODEL 3473	MRD:	SEE	DWG	NO:	11900800
MODEL 5201	MRD:	SEE	DWG	NO:	11902070

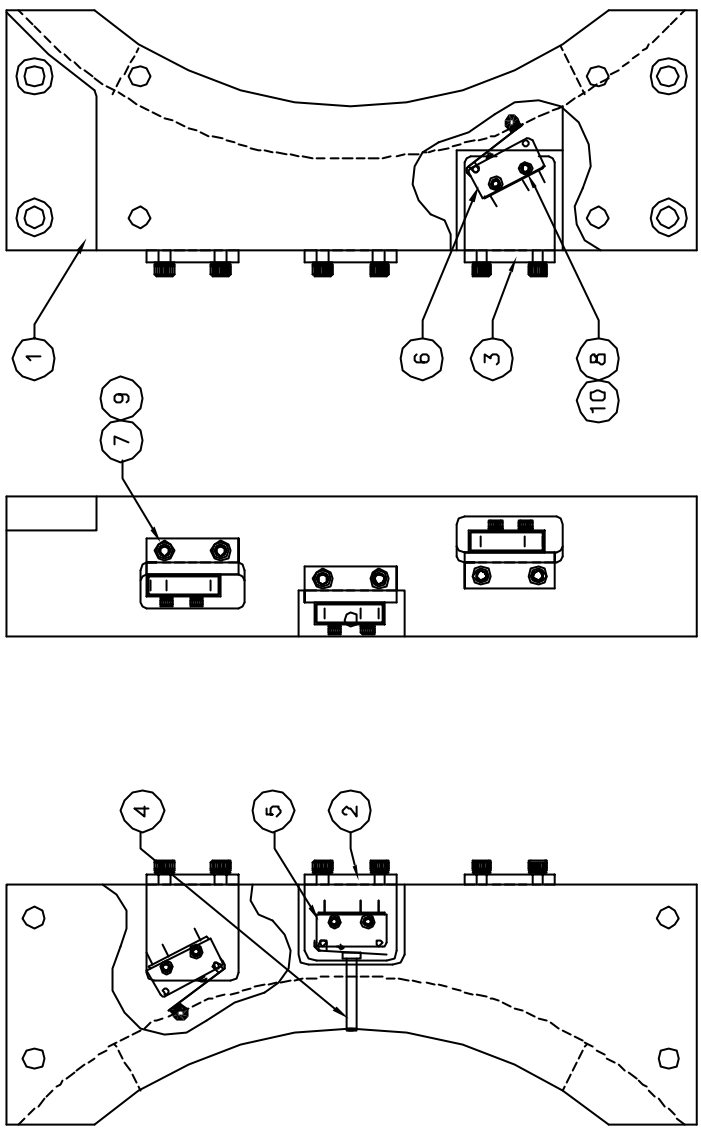
[illegible]

PROPRIETARY

REVISIONS			
REV	DESCRIPTION	DRAFT	DATE
A	RELEASE		07/07/97
			G. DOUGLAS

10	6	BN 752	WASHER, LOOK SP/S M2 X 0.5 SP/S	
9	6	BN 792	WASHER, LOOK SP/S M3 X 0.9 SP/S	
8	6	DN 912	BOLT, SHCS M2 X 10 S/S	
7	6	DN 912	BOLT, SHCS M3 X 10 S/S	
6	2	V4N17	MICROSWITCH, BURGESS	
5	1	V4N19	MICROSWITCH, BURGESS	
4	1	17901170	SHAFT, ZERO MICROSWITCH	
3	2	17901160	BRACKET, LIMIT MICROSWITCH	
2	1	17901150	BRACKET, ZERO MICROSWITCH	
1	1	17901070	STOP BLOCK	
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

DRAWN G.D.GLOUGLAS	DATE 05/02/97	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)										GMW										PARTS LIST									
CHECK	DATE	ENGINEERING										DATE										955 Industrial Rd., San Carlos, CA 94070 Tel: (650)802-8292. Fax: (650)802-8298.									
																						TITLE									
																						MOTORIZED.ROT.DRIVE									
																						STOP BLOCK ASSY									
																						REV									
11900870																						DRAWING NO.									
NEXT ASSY	SYSTEM																					A2 11900840 A									
SOFTWARE AUTOCAD 2000																						SCALE 1:1 WT kg SHEET 1 OF 1									
																						THIRD ANGLE PROJECTION									
																						FINISH / B.S.P. 1/8"									
																						X X X X ±.01 ±.01									
																						X X ±.05 ±.05									
																						X ±.06 ±.1									
																						DIE ±.5 ±0.5									



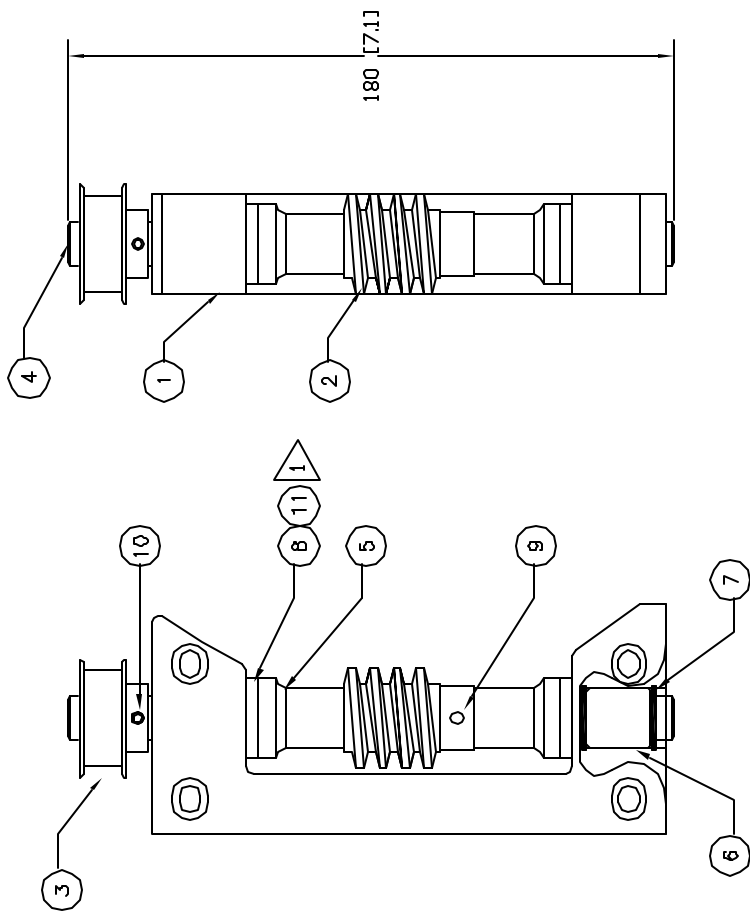
BOTTOM VIEW

REAR VIEW

TOP VIEW

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		07/07/97	G.DOUGLAS
B	ADD ITEM 11 AND NOTE: 1, CHG ITEM 3		11/27/97	G.DOUGLAS
C	CHG ITEM 3		04/08/98	G.DOUGLAS



TOP VIEW

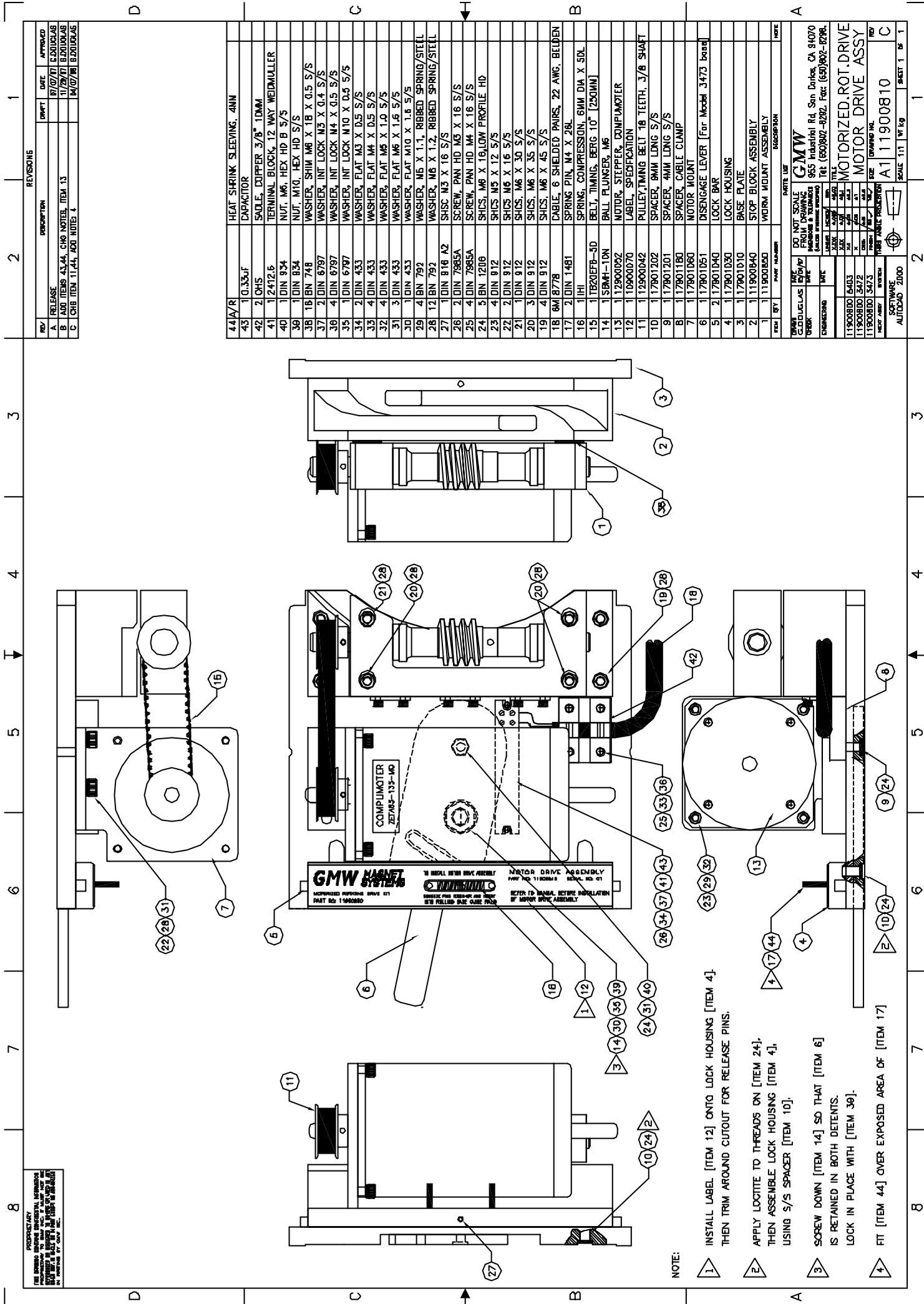
FRONT VIEW

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
11	A/R	BN 74B	SHIM WASHER, 14 X 28 X 0.1MM THICK	
10	1	DIN 1481	PIN, SPRING, M4 X 28L SP/S	
9	1	DIN 1481	PIN, SPRING M4 X 18L, SP/S	
8	2	BR5-3	BEARING, THRUST, BERG	
7	4	A 9028-68	RETAINING RING [CIRCLIP], SDP	
6	2	S99NH2-BN1624	BEARING, NEEDLE ROLLER, SDP	
5	2	17901190	SPACER, WORM	
4	1	12900060	WORM SHAFT	
3	1	12900041	PULLEY, 18 TEETH [FOR 1/2" SHAFT]	
2	1	12900030	WORM	
1	1	17901080	WORM MOUNT	

DRAWN		DATE	PARTS LIST	
G. DOUGLAS		05/03/97	GMW	
CHECK		DATE	955 Industrial Rd, San Carlos, CA 94070	
ENGINEERING		DATE	Tel: (650)802-8292. Fax: (650)802-8298.	
			TITLE	
			MOTORIZED.ROT.DRIVE	
			WORM MOUNT ASSY	
			SIZE	REV
			A2	C
			DRAWING NO.	
			11900850	
			SCALE 1:1 WT KG	
			SHEET 1 OF 1	

NOTE:

1. USE ITEM 11 TO PACK WORM DRIVE ASSEMBLY TO REDUCE SHAFT AXIAL MOVEMENT TO MINIMUM POSSIBLE. SHAFT MUST ROTATE FREELY.



PROPRIETARY
THE DESIGN AND CONSTRUCTION INFORMATION
CONTAINED HEREIN IS THE PROPERTY OF GMW INC.
AND IS NOT TO BE REPRODUCED OR TRANSMITTED
IN ANY FORM OR BY ANY MEANS, ELECTRONIC
OR MECHANICAL, INCLUDING PHOTOCOPYING,
RECORDING, OR BY ANY INFORMATION
STORAGE AND RETRIEVAL SYSTEM, WITHOUT
THE WRITTEN PERMISSION OF GMW INC.

NOTE:

- 1 INSTALL LABEL [ITEM 12] ONTO LOCK HOUSING [ITEM 4].
THEN TRIM AROUND CUTOFF FOR RELEASE PINS.
- 2 APPLY LOGOITE TO THREADS ON [ITEM 24].
THEN ASSEMBLE LOCK HOUSING [ITEM 4],
USING S/S SPACER [ITEM 10].
- 3 SCREW DOWN [ITEM 14] SO THAT [ITEM 6]
IS RETAINED IN BOTH DETENTS.
LOCK IN PLACE WITH [ITEM 36].
- 4 FIT [ITEM 44] OVER EXPOSED AREA OF [ITEM 17]

REVISIONS		
REV	DESCRIPTION	DATE
A	RELEASE	8/10/11 E20UCLAB
B	ADD ITEMS 43,44, CHG NOTES, ITEM 13	11/29/11 E20UCLAB
C	CHG ITEM 11,44, ADD NOTES 4	04/07/16 E20UCLAB

44A/R		HEAT SHRINK SLEEVING, 4MM
43	1 Q.33.F	CAPACITOR
42	2 QHS	SADLE, COPPER 3/8" 10MM
41	1 2412.5	TERMINAL BLOCK, 12 WAY WEIDMULLER
40	1 DIN 934	NUT, M6, HEX HD B 5/5
39	1 DIN 934	NUT, M10, HEX HD S/S
38	16 BN 748	WASHER, SHIM M6 X 18 X 0.5 S/S
37	2 DIN 6797	WASHER, INT LOCK M3 X 0.4 S/S
36	4 DIN 6797	WASHER, INT LOCK M4 X 0.5 S/S
35	1 DIN 6797	WASHER, INT LOCK M10 X 0.5 S/S
34	2 DIN 433	WASHER, FLAT M3 X 0.5 S/S
33	4 DIN 433	WASHER, FLAT M4 X 0.5 S/S
32	4 DIN 433	WASHER, FLAT M5 X 1.0 S/S
31	3 DIN 433	WASHER, FLAT M6 X 1.6 S/S
30	1 DIN 433	WASHER, FLAT M10 X 1.6 S/S
29	4 BN 792	WASHER, M5 X 1.1, RIBBED SPRING/STEEL
28	12 BN 792	WASHER, M6 X 1.2, RIBBED SPRING/STEEL
27	1 DIN 916 A2	SHCS M3 X 16 S/S
26	2 DIN 7985A	SCREW, PAN HD M5 X 16 S/S
25	4 DIN 7985A	SCREW, PAN HD M4 X 16 S/S
24	5 BN 1206	SHCS M6 X 18, LOW PROFILE HD
23	4 DIN 912	SHCS M5 X 12 S/S
22	2 DIN 912	SHCS M6 X 16 S/S
21	1 DIN 912	SHCS M6 X 30 S/S
20	3 DIN 912	SHCS M6 X 35 S/S
19	4 DIN 912	SHCS M6 X 45 S/S
18	6M 8778	CABLE, 6 SHIELDED PAIRS, 22 AWG, BELDEN
17	2 DIN 1481	SPRING PIN, M4 X 28L
16	1 IH1	SPRING, COMPRESSION, 6MM DIA X 50L
15	1 TBZDFB-5D	BELT, TIMING, BERG 10" [250MM]
14	1 58M-1DN	BALL, FLINGER, M6
13	1 12900032	MOTOR, STEPPER, COMPMOTOR
12	1 10900070	LABEL, SPECIFICATION
11	1 12900042	PULLEY, TIMING BELT 18 TEETH, 3/8 SHAFT
10	1 17601202	SPACER, 9MM LONG S/S
9	1 17601201	SPACER, 4MM LONG S/S
8	1 17601180	SPACER, CABLE CLAMP
7	1 17601060	MOTOR MOUNT
6	1 17601051	DISENGAGE LEVER [For Model 3473 base]
5	2 17601040	LOCK BAR
4	1 17601030	LOCK HOUSING
3	1 17601010	BASE PLATE
2	1 11900840	STOP BLOCK ASSEMBLY
1	1 11900800	WORM MOUNT ASSEMBLY

DO NOT SCALE
FROM DRAWING
UNLESS OTHERWISE SPECIFIED

DATE: 11/29/11
BY: E20UCLAB
CHECKED: E20UCLAB
ENGINEERING: E20UCLAB

GMW

955 Industrial Rd. San Dimas, CA 91070
Tel: (650)802-8282, Fax: (650)802-8284

**MOTORIZED, ROT. DRIVE
MOTOR DRIVE ASSY**

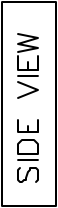
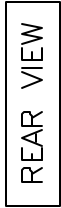
SIZE: A111900810
REV: C

SCALE: 1:11 WT/Kg

SHEET 1 OF 1

ITEM	QTY	UNIT	DESCRIPTION
1	1	EA	WORM MOUNT ASSEMBLY
2	1	EA	STOP BLOCK ASSEMBLY
3	1	EA	BASE PLATE
4	1	EA	LOCK HOUSING
5	2	EA	LOCK BAR
6	1	EA	DISENGAGE LEVER [For Model 3473 base]
7	1	EA	MOTOR MOUNT
8	1	EA	SPACER, CABLE CLAMP
9	1	EA	SPACER, 4MM LONG S/S
10	1	EA	SPACER, 9MM LONG S/S
11	1	EA	PULLEY, TIMING BELT 18 TEETH, 3/8 SHAFT
12	1	EA	LABEL, SPECIFICATION
13	1	EA	MOTOR, STEPPER, COMPMOTOR
14	1	EA	BALL, FLINGER, M6
15	1	EA	BELT, TIMING, BERG 10" [250MM]
16	1	EA	SPRING, COMPRESSION, 6MM DIA X 50L
17	2	EA	SPRING PIN, M4 X 28L
18	6	EA	CABLE, 6 SHIELDED PAIRS, 22 AWG, BELDEN
19	4	EA	SHCS M6 X 45 S/S
20	3	EA	SHCS M6 X 35 S/S
21	1	EA	SHCS M6 X 30 S/S
22	2	EA	SHCS M6 X 16 S/S
23	4	EA	SHCS M5 X 12 S/S
24	5	EA	SHCS M6 X 18, LOW PROFILE HD
25	4	EA	SCREW, PAN HD M4 X 16 S/S
26	2	EA	SCREW, PAN HD M5 X 16 S/S
27	1	EA	SHCS M3 X 16 S/S
28	12	EA	WASHER, M6 X 1.2, RIBBED SPRING/STEEL
29	4	EA	WASHER, M5 X 1.1, RIBBED SPRING/STEEL
30	1	EA	WASHER, FLAT M10 X 1.6 S/S
31	3	EA	WASHER, FLAT M6 X 1.6 S/S
32	4	EA	WASHER, FLAT M5 X 1.0 S/S
33	4	EA	WASHER, FLAT M4 X 0.5 S/S
34	2	EA	WASHER, FLAT M3 X 0.5 S/S
35	1	EA	WASHER, INT LOCK M10 X 0.5 S/S
36	4	EA	WASHER, INT LOCK M4 X 0.5 S/S
37	2	EA	WASHER, INT LOCK M3 X 0.4 S/S
38	16	EA	WASHER, SHIM M6 X 18 X 0.5 S/S
39	1	EA	NUT, M10, HEX HD S/S
40	1	EA	NUT, M6, HEX HD B 5/5
41	1	EA	TERMINAL BLOCK, 12 WAY WEIDMULLER
42	2	EA	SADLE, COPPER 3/8" 10MM
43	1	EA	CAPACITOR
44	1	EA	HEAT SHRINK SLEEVING, 4MM

REV	
A	RELEASE



- 1 TO SET HUB TO DESIRED ANGLE
- 1 LOOSEN THUMB NUT 2mm
- 2 PULL HUB FORWARD 2mm
- 3 ROTATE TO ANGLE REQUIRED
- 4 ROTATE SLIGHTLY BACK AND FORTH TO FIND INDEX PIN
- 5 PUSH HUB REARWARDS
- 6 TIGHTEN THUMB NUTS

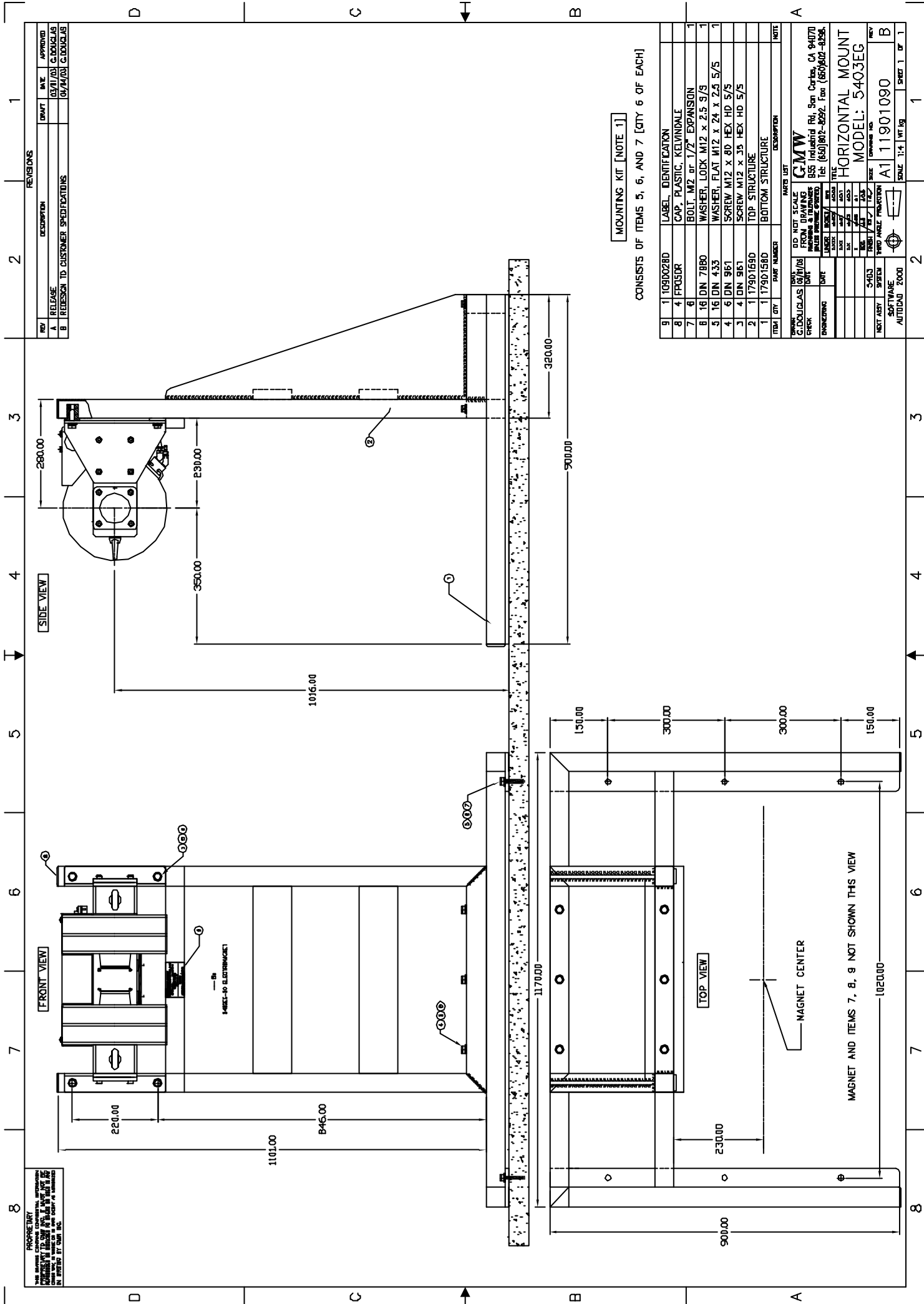
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		08/16/98	G. DOUGLAS

24	4	ISO 7380	SHCS M6 X 12 BUTTON HD S/S
23	4	DIN 433	WASHER, M6 X 1.6 FLAT S/S
22	1	17903000	MAGNET MOUNTING PLATE
21	1	10900320	LABEL, IDENTIFICATION
20	1	1SBMHB	BALL PLUNGER, M8 S/S VLER
19	2	VSM 12771B	DOWEL PIN M1 X 5 S/S [Index Pin]
18	1	1BN 1073	SET SCREW, M6 X 5 SLOTTED HD NYLON
17	4	ISO 7380	SHCS M4 X 8 BUTTON HD S/S
16	5	DIN 7991	SHCS, M4 X 6 FLAT HEAD S/S
15	2	DIN 917	SHS5 M4 X 8 CONE POINT S/S
14	2	08M04X070TN	THUMB NUT, NYLON
13	3	18-B30	ITEM PRODUCTS, END CAP, PLASTIC
12	1	17902010	BASE STUD
11	1	17902000	HUB STUD
10	1	17901990	HUB INSERT [For Sertron Hall Probes]
9	1	17901980	HUB INSERT [For Metrolab NMR probes]
8	1	17901970	HUB INSERT [for Grp3 MPT Hall Probes]
7	1	17901960	HUB COVER
6	1	17901950	HUB BASE
5	1	17901943	VERTICAL MOUNTING EXTRUSION
4	1	17901930	BASE NUT
3	1	17901920	BASE SUPPORT
2	1	17902090	BASE MOUNTING EXTRUSION
1	1	17902080	BASE MOUNTING PLATE
ITEM	QTY	PART IN LINES	DESCRIPTION
			NOTE

[illegible]

Section 7

CUSTOM OPTIONS



REV	DESCRIPTION	DRAWN	DATE	APPROVED
A	RELEASE		03/01/03	C. DONALD
B	REDUCED TO CUSTOMER SPECIFICATIONS		04/04/03	C. DONALD

MOUNTING KIT [NOTE 1]

CONSISTS OF ITEMS 5, 6, AND 7 [QTY 6 OF EACH]

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
9	1	109100280	LABEL IDENTIFICATION	
8	4	FR05DR	CAP. PLASTIC, KELVINDALE	
7	6		BOLT, M2 or 1/2" EXPANSION	
6	16	DN 7880	WASHER, LOCK M12 x 2.5 9/9	
5	16	DN 433	WASHER, FLAT M12 x 24 x 2.5 5/5	
4	6	DN 961	SCREW M12 x 80 HEX HD 5/5	
3	4	DN 961	SCREW M12 x 35 HEX HD 5/5	
2	1	17901690	TOP STRUCTURE	
1	1	17901580	BOTTOM STRUCTURE	

DO NOT SCALE FROM DRAWING		GMW		REV	
FROM DIMENSIONS		955 Industrial Rd, San Carlos, CA 94070		A111901090	
FOR FABRICATOR		Tel: (650) 602-8292 Fax: (650) 602-4356		B	
ENGINEERING		HORIZONTAL MOUNT		SHEET 1 OF 1	
DATE		MODEL: 5403EG		SCALE 1:4	
TIME		DRAWN NO		WT/LG	
MATERIAL		SIZE		OF 1	
MOUNT ASSEMBLY		PART NUMBER		SHEET 1 OF 1	
SOFTWARE		AUTOCAD 2000		SHEET 1 OF 1	

Section 8

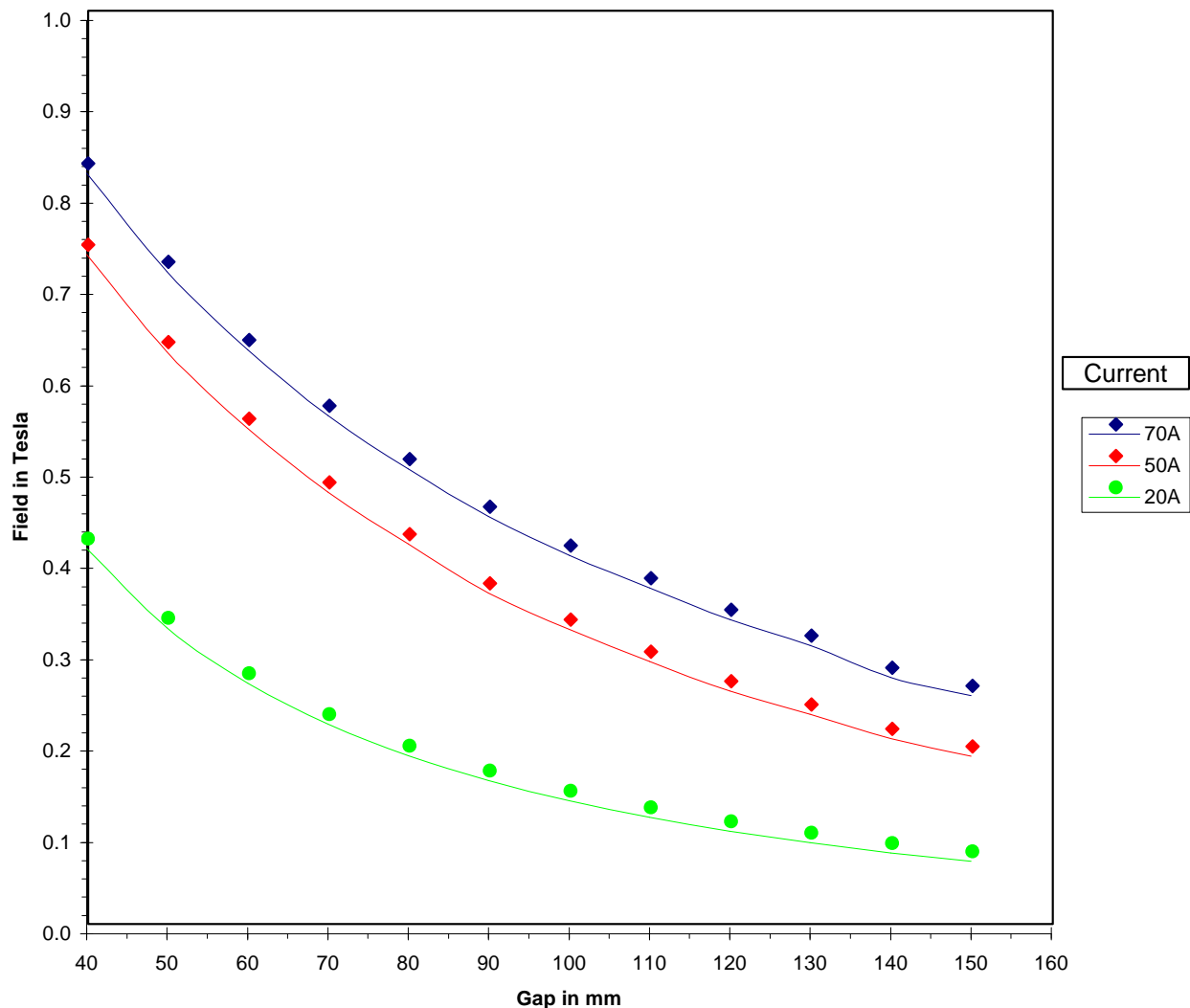
EXCITATION CURVES

GMW Associates

Electromagnet Excitation Plot

Field Vs Gap

Contract No:		Page: 1 of 2	Date: May 29, 2003
Customer:			Engr: G.Douglas
Model: 5403EG		Power Supply:	Set Current:
Serial No: 01		Serial No:	Target Field:
Pole Face: 76 mm		Position: X=0, Y=0, Z=0	
Serial No: None		Notes:	
Pole Gap:			
Pole Spacers: None			

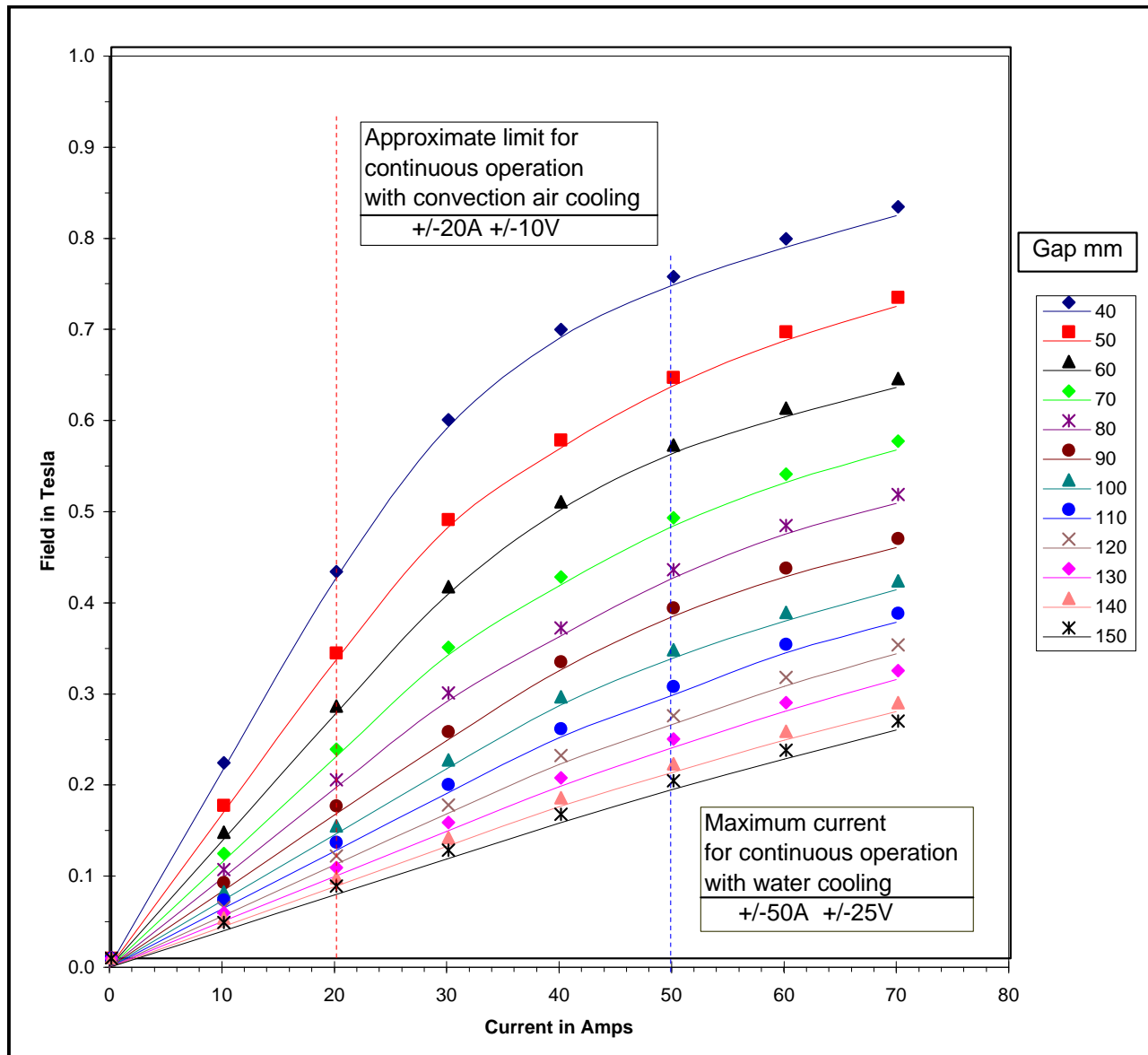


GMW Associates

Electromagnet Excitation Plot

Field Vs Current

Contract No:	Page: 2 of 2	Date: June 25, 03
Customer:		Engr: G.Douglas
Model: 5403EG	Power Supply:	Set Current:
Serial No:	Serial No:	Target Field:
Pole Face: 76	Position: X=0, Y=0, Z=0	
Serial No: None	Notes:	
Pole Gap: As per table below		
Pole Spacers: None		



Section 9

TEST DATA

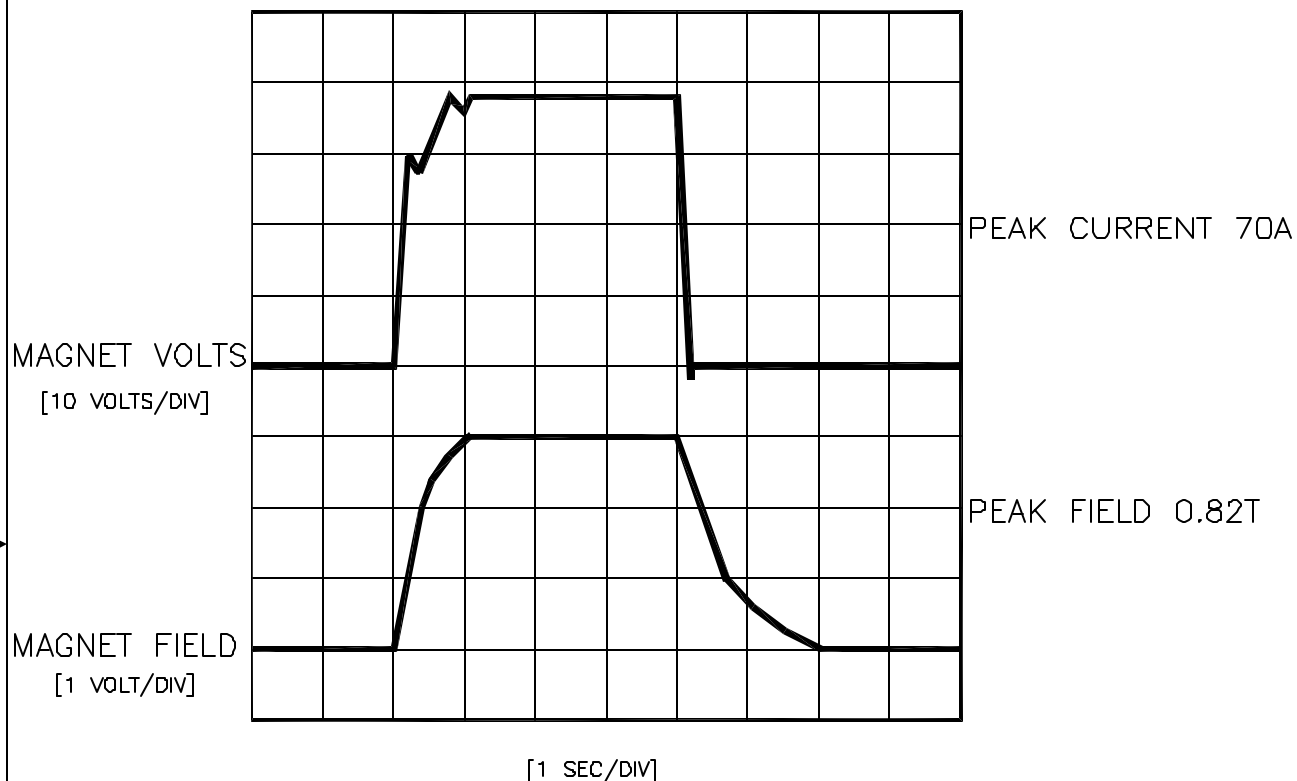
MEASUREMENT RESULT

ELECTROMAGNET

MODEL: 5403EG
SERIAL NO: 01
POLE CAP DIA: 76MM
POLE CAP: 40MM

POWER SUPPLY

MANUFACTURER: POWER TEN
MODEL: P62B-4075
SERIAL NO: 1007626
OUTPUT: 40 VOLTS @ 75 AMPS



GMW

955 Industrial Rd, San Carlos CA 94070
Tel: (650)802-8292. Fax: (650)802-8298

DOCUMENT TITLE

AC RESPONSE
MODEL: 5403EG

PROPRIETARY

This document contains information proprietary to GMW Inc. It must not be reproduced or disclosed to others or used in any other way, in whole or part, except as authorized in writing by GMW Inc.

DOCUMENT NO.

88900002

DOCUMENT REV.

A

MEASUREMENTS MADE BY

E.SCHULZE

DATE

02/04/98

SERIAL NO.

PREPARED BY

G.DOUGLAS

DATE

02/27/98

APPLIES TO ASSY No.

11901050

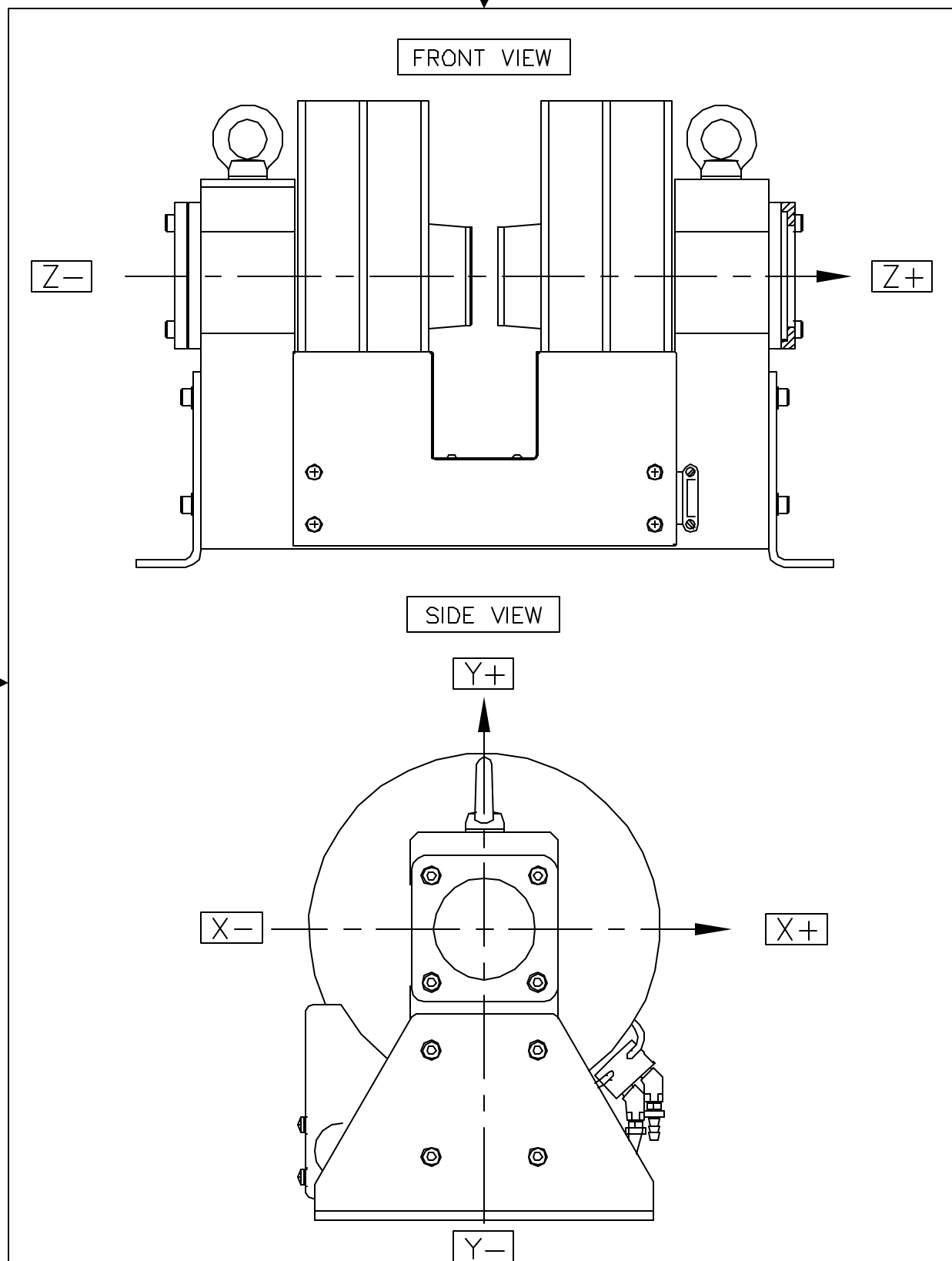
COMPANY

GMW ASSOCIATES

APPROVED BY

DATE

SHEET 1 OF 1



PROPRIETARY

This document contains information proprietary to GMW Inc. It must not be reproduced or disclosed to others or used in any other way, in whole or part, except as authorized in writing by GMW Inc.

MAGNETIC PLOTTING AXIS

11901130

A

SHEET 1 OF 1

Section 10

DRAWINGS

[illegible]

- [illegible]

PROPRIETARY
THIS DRAWING IS THE PROPERTY OF GMW. IT IS TO BE USED FOR THE PURPOSES SPECIFIED AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF GMW. BY THE USE OF THIS DRAWING, THE USER AGREES TO HOLD GMW HARMLESS FROM ANY AND ALL CLAIMS, DAMAGES, LOSSES, AND EXPENSES, INCLUDING ATTORNEY'S FEES, THAT MAY BE ASSERTED AGAINST GMW BY ANY THIRD PARTY AS A RESULT OF THE USER'S USE OF THIS DRAWING.

8 7 6 5 4 3 2 1

1 2 3 4 5 6 7 8

FRONT VIEW

SIDE VIEW

MAGNET WIRING SCHEMATIC

FRONT VIEW

BOTTOM VIEW

NOTES:

1. BOLTS USED TO SECURE POLE WITHOUT SPACERS. [ITEM 4] x SHCS M6 x 16 LONG [NOT SHOWN].
2. POLE CAP FIXED BY POLE SPACERS [ITEM 4] MIN GAP 40 mm MAGNET SHOWN WITH 10 mm POLE SPACERS FOR 60 mm GAP
3. RH SIDE CABLE ENTRY SHOWN. LH ENTRY OPTIONAL

REVISIONS

REV	DESCRIPTION	DATE	APPROVED
A	INITIALS		
B	CHG POLE DESIGN AND POLE RETAINER [ITEM 28]	12/17/99	BLACKHAWK
C	CHG COIL ENTRY SPACIFICATIONS	07/24/00	BLACKHAWK
D	WEIGH MAGNET AND CORRECT MASS TO SPECIFICATION	06/07/00	BLACKHAWK
E	REAR VIEW OF MAGNET NOW CHAINED TO FRONT VIEW	06/17/00	BLACKHAWK

ITEMS LIST

ITEM	QTY	DESCRIPTION
29	2	POLE RETAINER
28	1	LABEL, GROUND [Fitted under Cover]
27	1	LABEL, CAUTION [RT Side]
26	1	LABEL, SPECIFICATION [LH side]
25	1	CABLE ASSY, INTERLOCK LINK
24	1	CABLE ASSY, CURRENT LINK
23	5	WASHER, M6 X 0.7 INT LOCK, S/S
22	4	WASHER, M6 X 1.8 SPRING LOCK, S/S
21	16	WASHER, M6 X 2 SPRING LOCK, S/S
20	2	WASHER, M5 X 15 X 3, NEOPRENE
19	5	WASHER, M6 X 16 X 1.6 FLAT S/S
18	32	WASHER, M8 X 15 X 2 FLAT S/S
17	2	WASHER, M12 X 13 X 2 FLAT S/S
16	5	SCREW, M6 X 12, PAN S/S
15	4	SHCS, M6 X 12 S/S
14	24	SHCS, M8 X 16 S/S
13	8	SHCS, M8 X 20 S/S
12	8	SHCS, M8 X 30 S/S
11	1	CABLE CLAMP, T & B
10	2	TEMP SENSOR, 50°C 10-32UNF ELMW000
9	2	EYEBOLT, M12
8	2	ANGLE BRACKET
7	1	TERMINAL COVER BRACKET [WITHOUT HOLE]
6	1	TERMINAL COVER BRACKET, [WITH HOLE]
5	1	TERMINAL COVER
4	2	POLE SPACER, 10MM THICK
3	2	POLE, 78MM FACE
2	2	COIL ASSEMBLY
1	1	YOKE

DO NOT SCALE FROM DRAWING

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)602-4292 Fax: (650)602-0086

MAGNET ASSEMBLY
MODEL: 5403EG-20

ITEMS LIST

ITEM	QTY	DESCRIPTION
29	2	POLE RETAINER
28	1	LABEL, GROUND [Fitted under Cover]
27	1	LABEL, CAUTION [RT Side]
26	1	LABEL, SPECIFICATION [LH side]
25	1	CABLE ASSY, INTERLOCK LINK
24	1	CABLE ASSY, CURRENT LINK
23	5	WASHER, M6 X 0.7 INT LOCK, S/S
22	4	WASHER, M6 X 1.8 SPRING LOCK, S/S
21	16	WASHER, M6 X 2 SPRING LOCK, S/S
20	2	WASHER, M5 X 15 X 3, NEOPRENE
19	5	WASHER, M6 X 16 X 1.6 FLAT S/S
18	32	WASHER, M8 X 15 X 2 FLAT S/S
17	2	WASHER, M12 X 13 X 2 FLAT S/S
16	5	SCREW, M6 X 12, PAN S/S
15	4	SHCS, M6 X 12 S/S
14	24	SHCS, M8 X 16 S/S
13	8	SHCS, M8 X 20 S/S
12	8	SHCS, M8 X 30 S/S
11	1	CABLE CLAMP, T & B
10	2	TEMP SENSOR, 50°C 10-32UNF ELMW000
9	2	EYEBOLT, M12
8	2	ANGLE BRACKET
7	1	TERMINAL COVER BRACKET [WITHOUT HOLE]
6	1	TERMINAL COVER BRACKET, [WITH HOLE]
5	1	TERMINAL COVER
4	2	POLE SPACER, 10MM THICK
3	2	POLE, 78MM FACE
2	2	COIL ASSEMBLY
1	1	YOKE

DO NOT SCALE FROM DRAWING

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)602-4292 Fax: (650)602-0086

MAGNET ASSEMBLY
MODEL: 5403EG-20

ITEMS LIST

ITEM	QTY	DESCRIPTION
29	2	POLE RETAINER
28	1	LABEL, GROUND [Fitted under Cover]
27	1	LABEL, CAUTION [RT Side]
26	1	LABEL, SPECIFICATION [LH side]
25	1	CABLE ASSY, INTERLOCK LINK
24	1	CABLE ASSY, CURRENT LINK
23	5	WASHER, M6 X 0.7 INT LOCK, S/S
22	4	WASHER, M6 X 1.8 SPRING LOCK, S/S
21	16	WASHER, M6 X 2 SPRING LOCK, S/S
20	2	WASHER, M5 X 15 X 3, NEOPRENE
19	5	WASHER, M6 X 16 X 1.6 FLAT S/S
18	32	WASHER, M8 X 15 X 2 FLAT S/S
17	2	WASHER, M12 X 13 X 2 FLAT S/S
16	5	SCREW, M6 X 12, PAN S/S
15	4	SHCS, M6 X 12 S/S
14	24	SHCS, M8 X 16 S/S
13	8	SHCS, M8 X 20 S/S
12	8	SHCS, M8 X 30 S/S
11	1	CABLE CLAMP, T & B
10	2	TEMP SENSOR, 50°C 10-32UNF ELMW000
9	2	EYEBOLT, M12
8	2	ANGLE BRACKET
7	1	TERMINAL COVER BRACKET [WITHOUT HOLE]
6	1	TERMINAL COVER BRACKET, [WITH HOLE]
5	1	TERMINAL COVER
4	2	POLE SPACER, 10MM THICK
3	2	POLE, 78MM FACE
2	2	COIL ASSEMBLY
1	1	YOKE

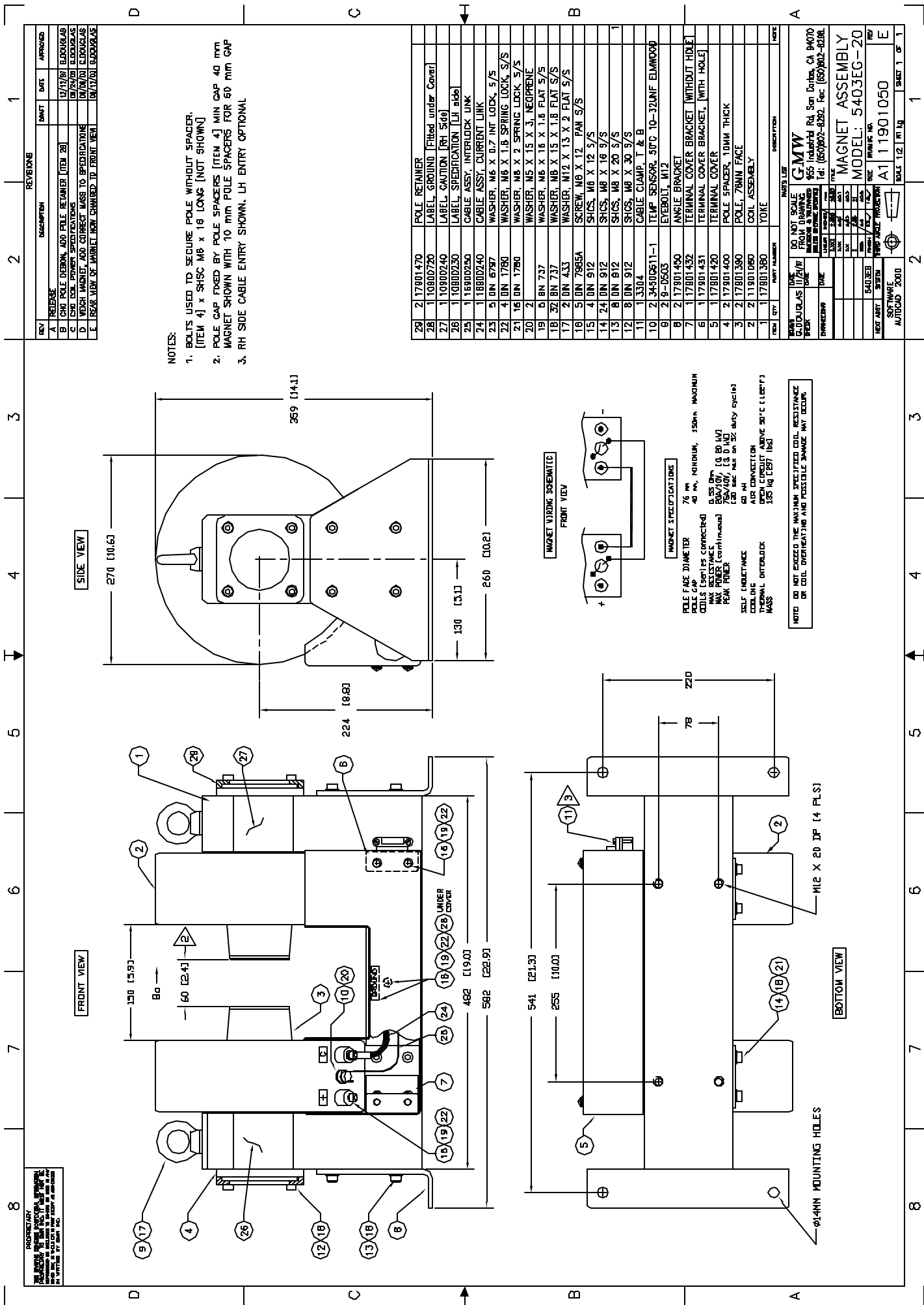
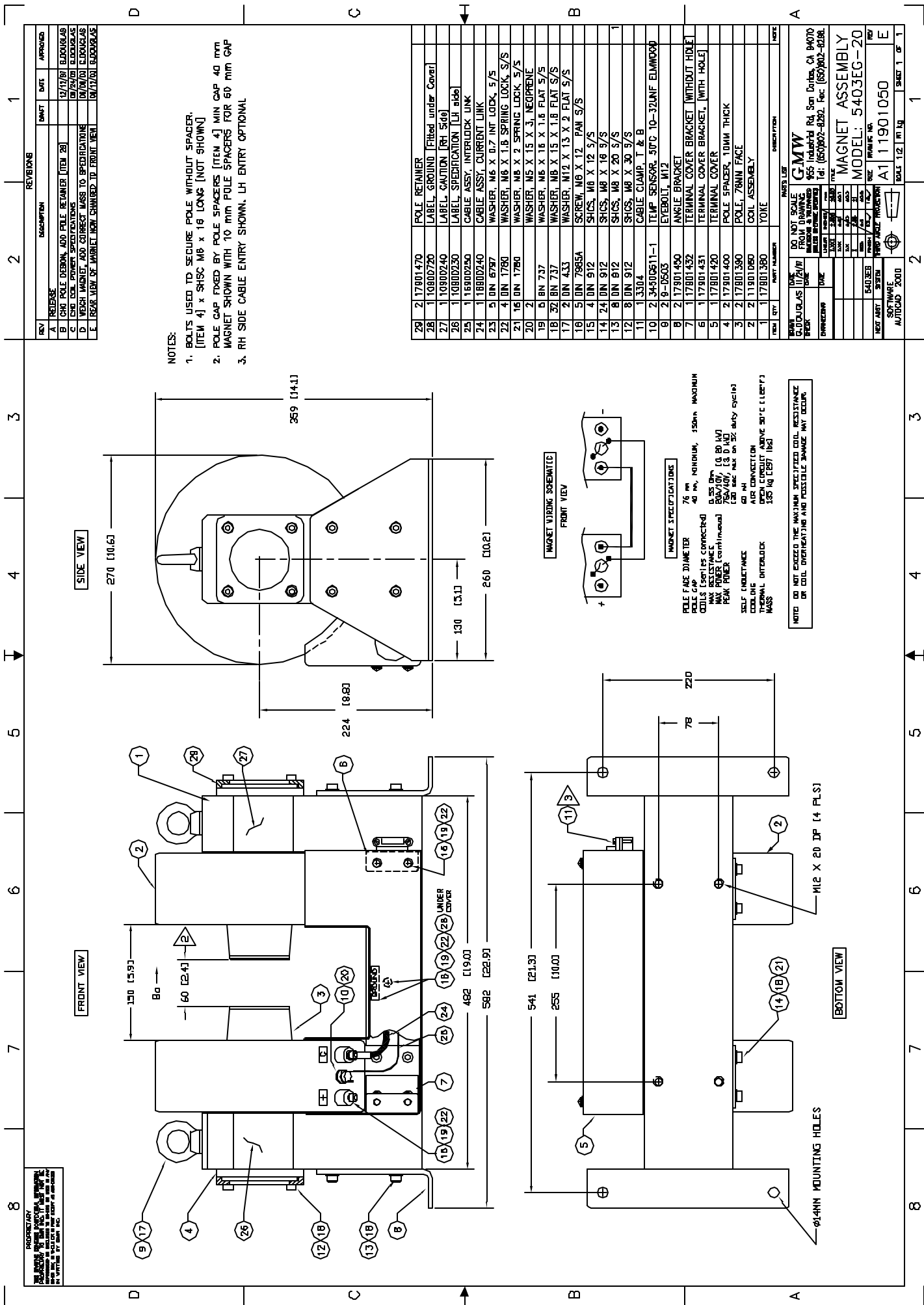
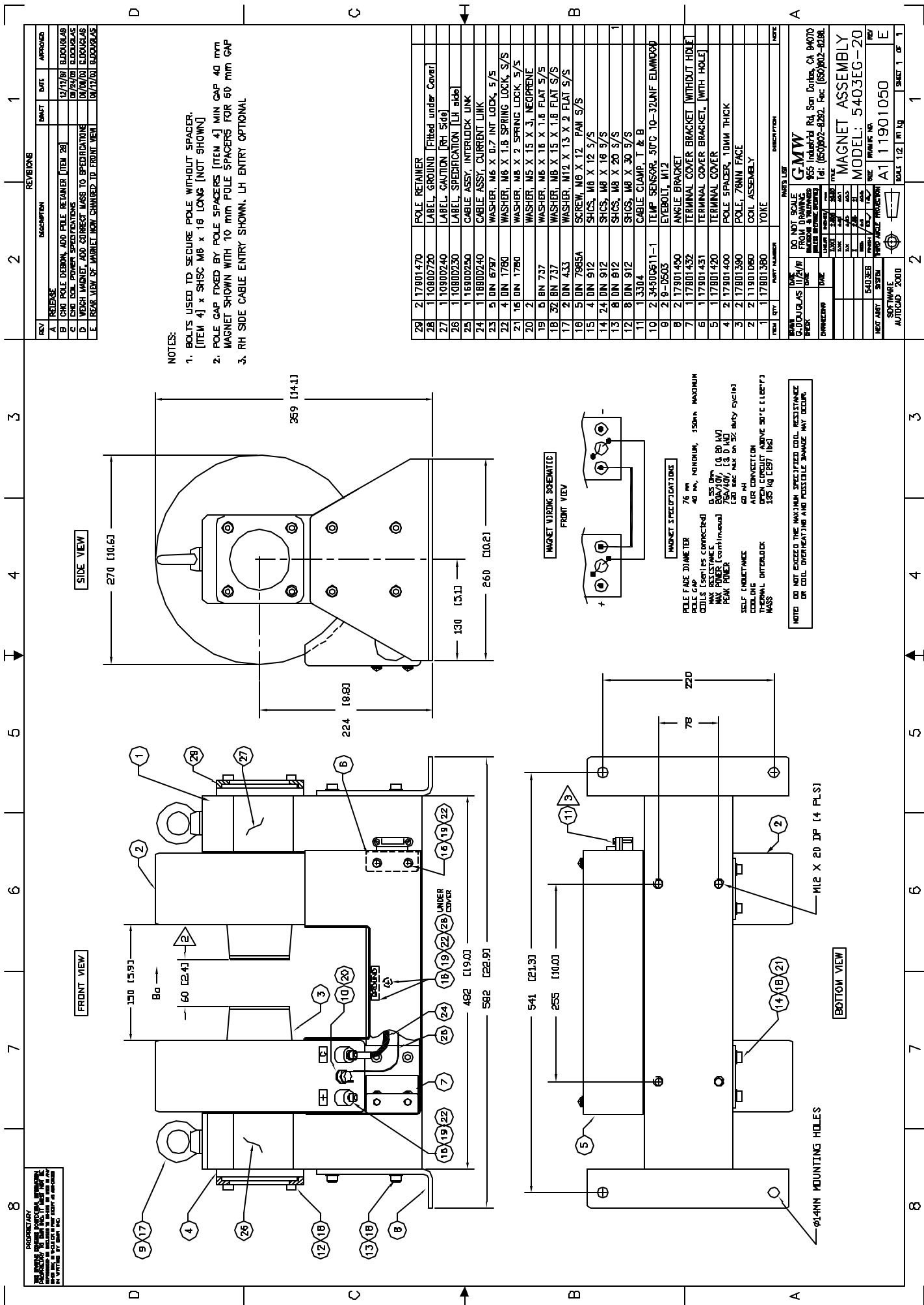
DO NOT SCALE FROM DRAWING

GMW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)602-4292 Fax: (650)602-0086

MAGNET ASSEMBLY
MODEL: 5403EG-20

ITEMS LIST

ITEM	QTY	DESCRIPTION
29	2	POLE RETAINER
28	1	LABEL, GROUND [Fitted under Cover]
27	1	L

[illegible][illegible][illegible]

POWER TEN MODEL: P62B-4075 POWER SUPPLY

POWER SUPPLY REAR VIEW

FRONT VJEV TERMINAL COVER REMOVED

WARNING

CHECK AC POWER VOLTAGE AND FREQUENCY MATCH POWER SUPPLY SPECIFIED REQUIREMENTS BEFORE APPLYING AC INPUT POWER

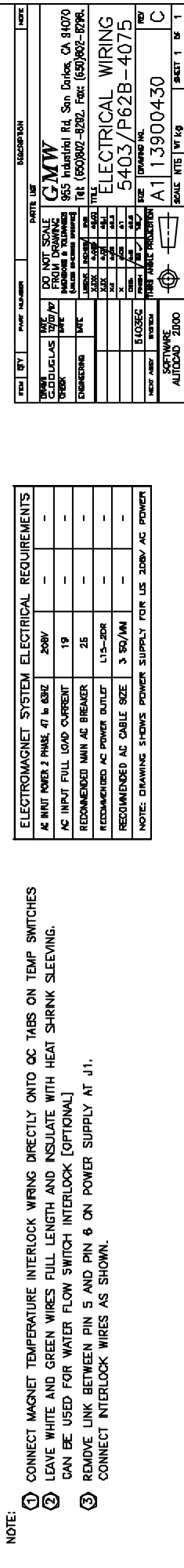
NOTE

1. POWER SUPPLY SHOWN WITH 2 PHASE 208V AC INPUT
2. REFER TO TABLE ON DWG 13000430 FOR AC INPUT RATINGS OTHER THAN 2 PHASE 208V
3. 5403EG-20 ELECTROMAGNET SHOWN. 5403EG-50/5403 HAS SAME ELECTRICAL CONNECTIONS.

N/S = NOT SUPPLIED

1	1	CRIMPLUG	
10	A/R	WIRE, 15 AWG PVC BLACK	
9	1	HEATSHRINK 12mm 1/2" SLEEVEING, BLACK	
8	1	RECTIFIER DIODE (Protection Diode) NTE	
7	1	CABLE TIE, NYLON 2.5MM WIDE, BAR-LOCK	
6	1	CABLE TIE, NYLON, ADHESIVE, BAR-LOCK	
5	44	POWER CORD, TYPE SO 3 CORE 12AWG N/S	
4	1	PLUG JPHASE 720V, NYLON, BRYANT	N/S
3	3	CABLE CLAMP THOMAS & BETTS	
2	1	AC TERMINAL BOX	
1	1	CURRENT & INTERLOCK CABLE BDA INT	
REQ	QTY	PART NUMBER	DESCRIPTION
			NOTE

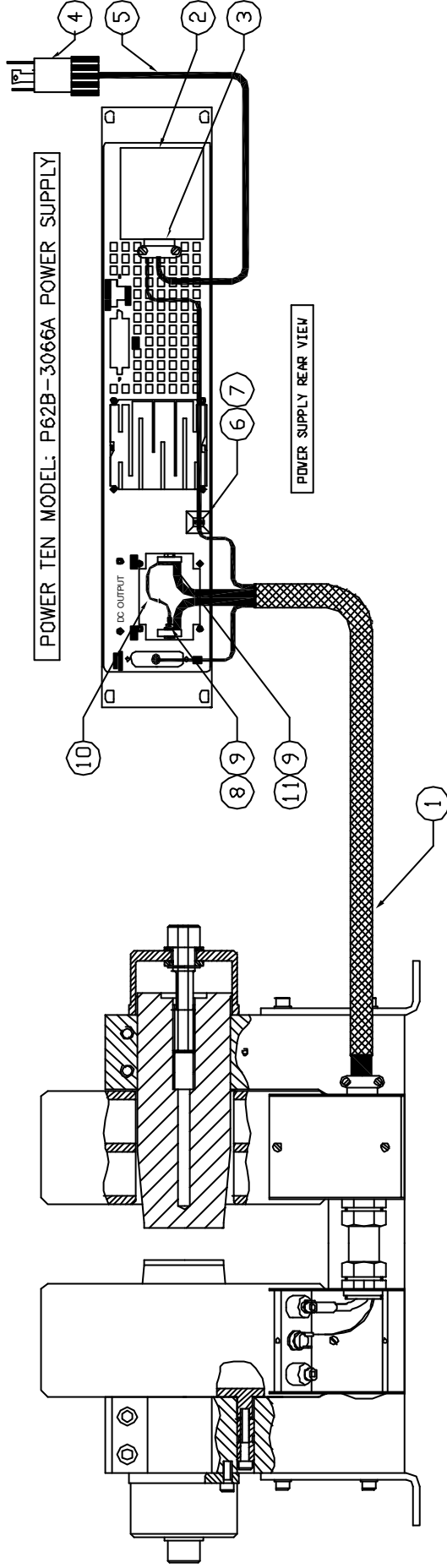
[illegible]



- ① CONNECT MAGNET TEMPERATURE INTERLOCK WIRING DIRECTLY ONTO QC TABS ON TEMP SWITCHES.
- ② LEAVE WHITE AND GREEN WIRES FULL LENGTH AND INSULATE WITH HEAT SHRINK SLEEVING. CAN BE USED FOR WATER FLOW SWITCH INTERLOCK [OPTIONAL]
- ③ REMOVE LINK BETWEEN PIN 5 AND PIN 6 ON POWER SUPPLY AT J1. CONNECT INTERLOCK WIRES AS SHOWN.

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	RELEASE	03/18/01	EJOUCLAB
B	ADD PROTECTION DOSE	04/12/01	EJOUCLAB

MODEL 5403/5403EG ELECTROMAGNET



FRONT VIEW LH TERMINAL COVER REMOVED

*** WARNING ***

CHECK AC POWER VOLTAGE AND FREQUENCY MATCH POWER SUPPLY
SPECIFIED REQUIREMENTS BEFORE APPLYING AC INPUT POWER

NOTE

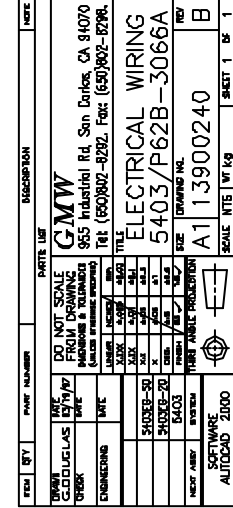
1. POWER SUPPLY SHOWN WITH 2 PHASE 208V AC INPUT
2. REFER TO TABLE ON DWG 13900240 FOR AC
INPUT RATINGS OTHER THAN 2 PHASE 208V
3. 5403 ELECTROMAGNET SHOWN.
5403EG-50/5403EG-20 SAME ELECTRICAL CONNECTIONS.

N/S = NOT SUPPLIED NOTE

ITEM	QTY	DESCRIPTION
1	1	CRIMPLUG
2	1	WIRE, 16 AWG PVC BLACK
3	1	HEATSHRINK 12mm 1/2" SLEEVING, BLACK
4	1	RECTIFIER DOSE (Protection Doze) NTE
5	1	CABLE TIE ADHESIVE NTC, NYL BAR-LOK
6	1	CABLE TIE NYLON 2.5mm WIDE, BAR-LOK
7	1	POWER CORD, TYPE SO 3 CORE 12AWG N/S
8	1	PLUS 3PHASE/20A, NYLON, BRYANT N/S
9	1	CABLE CLAMP, THOMAS & BETTS
10	1	AC TERMINAL BOX
11	1	CURRENT & INTERLOCK CABLE BDA

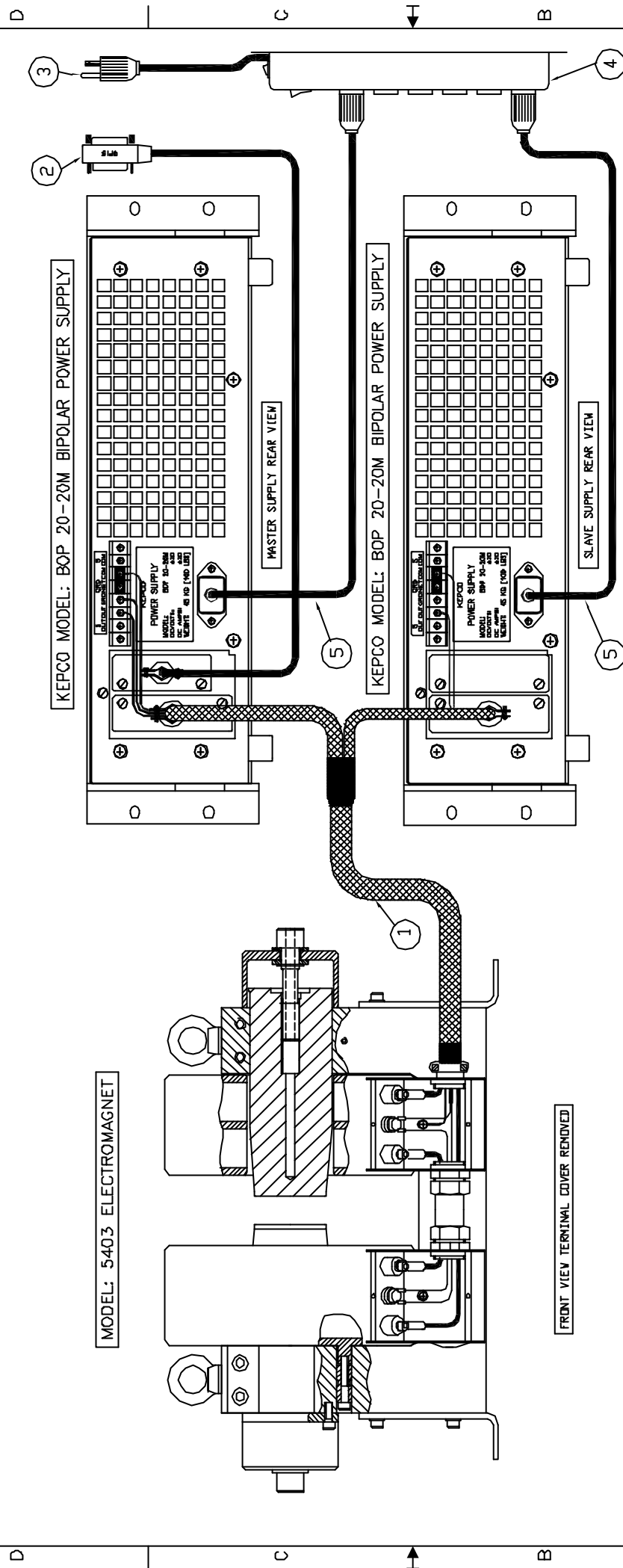
PARTS LIST			
ITEM	QTY	DESCRIPTION	NOTE
1	1	CRIMPLUG	
2	1	WIRE, 16 AWG PVC BLACK	
3	1	HEATSHRINK 12mm 1/2" SLEEVING, BLACK	
4	1	RECTIFIER DOSE (Protection Doze) NTE	
5	1	CABLE TIE ADHESIVE NTC, NYL BAR-LOK	
6	1	CABLE TIE NYLON 2.5mm WIDE, BAR-LOK	
7	1	POWER CORD, TYPE SO 3 CORE 12AWG N/S	
8	1	PLUS 3PHASE/20A, NYLON, BRYANT N/S	
9	1	CABLE CLAMP, THOMAS & BETTS	
10	1	AC TERMINAL BOX	
11	1	CURRENT & INTERLOCK CABLE BDA	

DO NOT SCALE FROM DRAWING			
955 Industrial Rd. San Carlos, CA 94070			
Tel: (650)902-8202, Fax: (650)902-8298			
GMW			
ELECTRICAL ASSEM			
5403/P62B-3066A			
A111900740			
SCALE: 1:1			
SHEET 1 OF 1			



- ① CONNECT MAGNET TEMPERATURE INTERLOCK WIRING DIRECTLY ONTO QC TABS ON TEMP SWITCHES
- ② LEAVE WHITE AND GREEN WIRES FULL LENGTH AND INSULATE WITH HEAT SHRINK SLEEVING.
CAN BE USED FOR WATER FLOW SWITCH INTERLOCK [OPTIONAL]
- ③ REMOVE LINK BETWEEN PIN 5 AND PIN 6 ON POWER SUPPLY AT J1.
CONNECT INTERLOCK WIRES AS SHOWN.

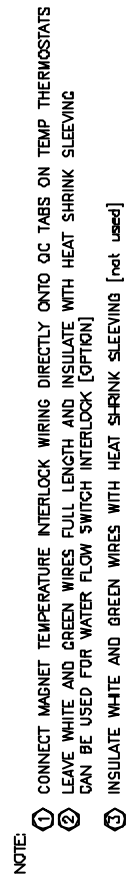
- ① CONNECT MAGNET TEMPERATURE INTERLOCK WIRING DIRECTLY ONTO QC TABS ON TEMP SWITCHES.
- ② LEAVE WHITE AND GREEN WIRES FULL LENGTH AND INSULATE WITH HEAT SHRINK SLEEVING. CAN BE USED FOR WATER FLOW SWITCH INTERLOCK [OPTIONAL]
- ③ REMOVE LINK BETWEEN PIN 5 AND PIN 6 ON POWER SUPPLY AT J1. CONNECT INTERLOCK WIRES AS SHOWN.



1. POWER SUPPLY SHOWN WITH 115V AC INPUT
2. GPIB INTERFACE IS OPTIONAL EQUIPMENT
3. REFER TO TABLE ON DWG 13800110 FOR AC INPUT RATINGS OTHER THAN 115V AC INPUT

CHECK AC POWER VOLTAGE AND FREQUENCY MATCH POWER SUPPLY SPECIFIED REQUIREMENTS BEFORE APPLYING AC INPUT POWER

[illegible]

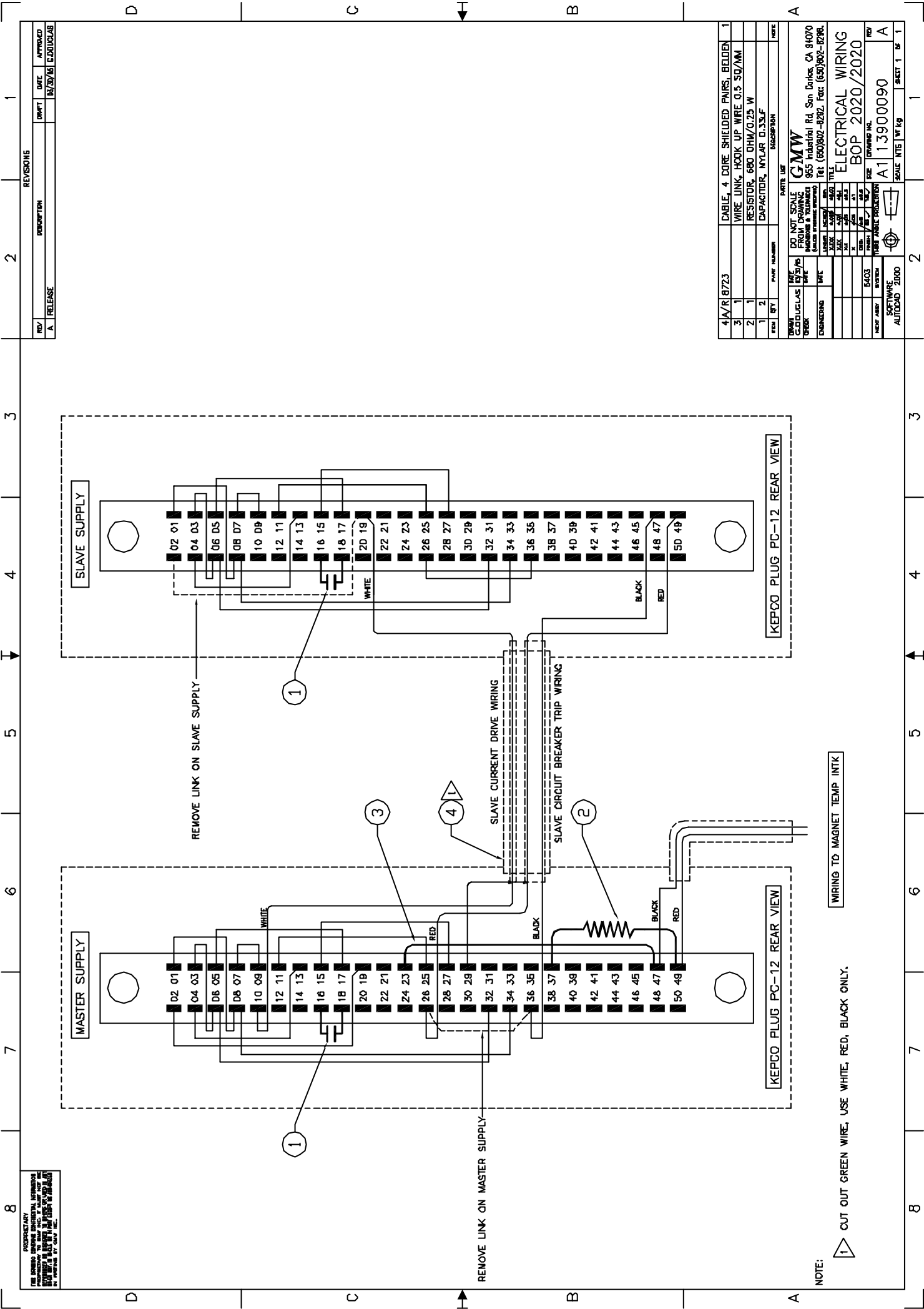


ELECTROMAGNET SYSTEM		ELECTRICAL REQUIREMENTS		
AC INPUT POWER 1 PHASE, 30 to 60W	115W	208V	230W	
AC INPUT FULL LOAD CURRENT	1.10A*	6.5A*	6.0A*	
RECOMMENDED MAIN AIR BREAKER	25	15	15	
RECOMMENDED AC POWER OUTLET	6-208			
RECOMMENDED AIR CABLE SIZE	1.5 SQ/MM	1.0 SQ/MM	1.0 SQ/MM	1.0 SQ/MM

NOTE: DRAWING SHOWS POWER SUPPLY SETUP FOR 1 PHASE 110V AC POWER

* RATING GIVEN FOR EACH POWER SUPPLY; TOTAL SYSTEM CURRENT (CABLE WELLS SHOWN)

[illegible]



PROPRIETARY
FOR BOMBARDIER
REPRODUCTION OF THIS DOCUMENT
WITHOUT THE WRITTEN PERMISSION
OF BOMBARDIER IS PROHIBITED
IN WHOLE OR IN PART

REVISIONS		
REV	DESCRIPTION	DATE
A	RELEASE	03/20/16

REV	DESCRIPTION	DATE
1	CABLE, 4 CORE SHIELDED PAIRS, BELDEN	
2	WIRE LINK, HOOK UP WIRE 0.5 SQ/MM	
3	RESISTOR, 680 OHM/0.25 W	
4	CAPACITOR, NYLAR 0.33UF	

PART LIST		DO NOT SCALE FROM DRAWING		GMW	
ITEM	QTY	DESCRIPTION	UNIT	ITEM	QTY
1	1	CABLE, 4 CORE SHIELDED PAIRS, BELDEN	1	1	1
2	1	WIRE LINK, HOOK UP WIRE 0.5 SQ/MM	1	2	1
3	1	RESISTOR, 680 OHM/0.25 W	1	3	1
4	1	CAPACITOR, NYLAR 0.33UF	1	4	1

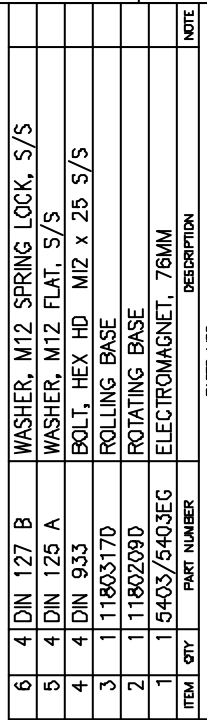
PART LIST		DO NOT SCALE FROM DRAWING		GMW	
ITEM	QTY	DESCRIPTION	UNIT	ITEM	QTY
1	1	CABLE, 4 CORE SHIELDED PAIRS, BELDEN	1	1	1
2	1	WIRE LINK, HOOK UP WIRE 0.5 SQ/MM	1	2	1
3	1	RESISTOR, 680 OHM/0.25 W	1	3	1
4	1	CAPACITOR, NYLAR 0.33UF	1	4	1

PART LIST		DO NOT SCALE FROM DRAWING		GMW	
ITEM	QTY	DESCRIPTION	UNIT	ITEM	QTY
1	1	CABLE, 4 CORE SHIELDED PAIRS, BELDEN	1	1	1
2	1	WIRE LINK, HOOK UP WIRE 0.5 SQ/MM	1	2	1
3	1	RESISTOR, 680 OHM/0.25 W	1	3	1
4	1	CAPACITOR, NYLAR 0.33UF	1	4	1

NOTE: 1 CUT OUT GREEN WIRE, USE WHITE, RED, BLACK ONLY.

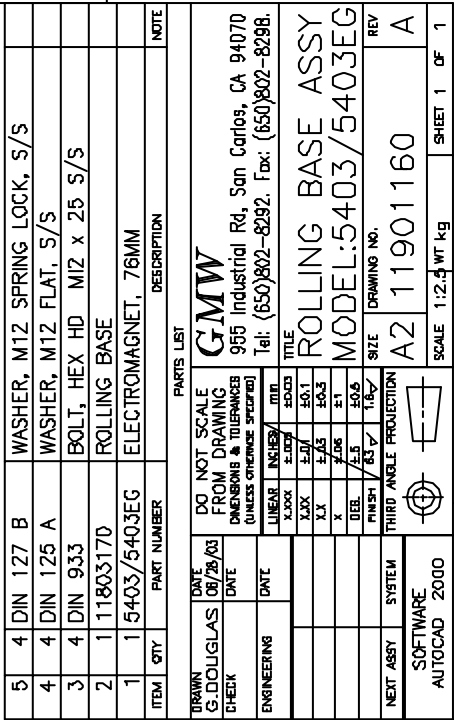
WIRING TO MAGNET TEMP INTK

REVISIONS			
REV	DESCRIPTION	DRAFT	DATE
A	RELEASE		06/28/03
			G. DOUGLAS

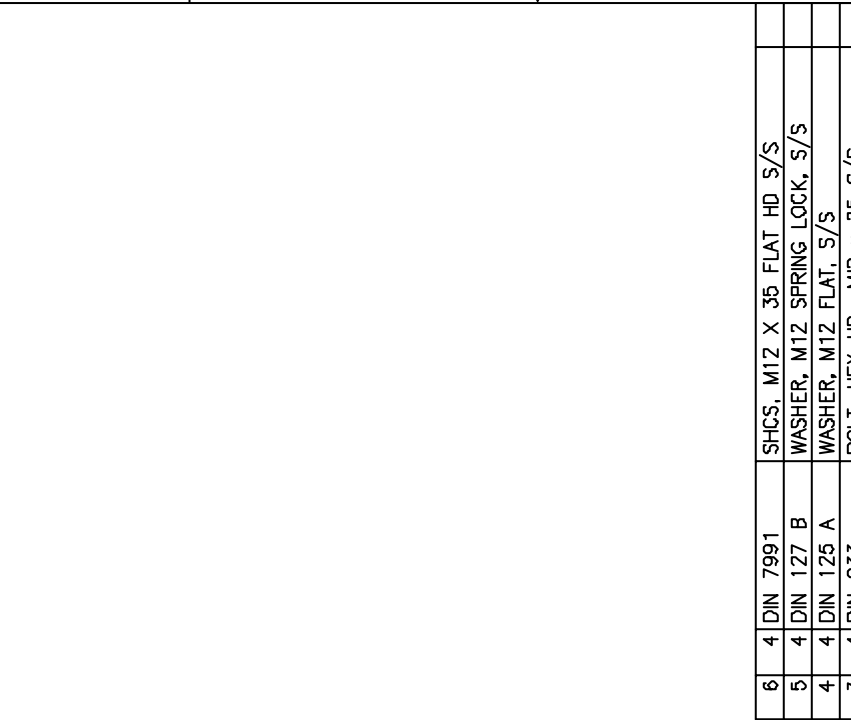


DATE	08/28/03	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)	PARTS LIST
CHECK	DATE		
ENGINEERING	DATE		
DATE	08/28/03	LINEAR X-XXX ±.003 Y-XX ±.01 Z ±.06 DEEL ±.5 FINISH ±.5 THIRD ANGLE PROJECTION	TITLE ROL/ROT BASE ASSY MODEL:5403/5403EG SIZE A2 11901180 DRAWING NO. A REV A
DATE	08/28/03	X-XXX ±.003 Y-XX ±.01 Z ±.06 DEEL ±.5 FINISH ±.5 THIRD ANGLE PROJECTION	SCALE 1:2.5 WT kg SHEET 1 OF 1

REVISIONS			
REV	DESCRIPTION	DRAFT	DATE
A	RELEASE		06/28/03
			G. DOUGLAS

[illegible]

REVISIONS			
REV	DESCRIPTION	DRAFT	DATE
A	RELEASE		06/30/03
			G. DOUGLAS

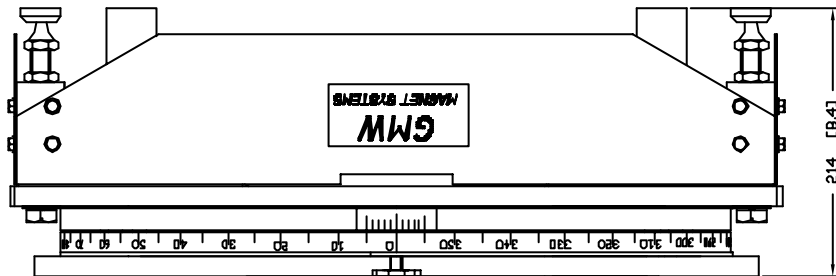


6	4	DIN 7991	SHCS, M12 X 35 FLAT HD S/S	
5	4	DIN 127 B	WASHER, M12 SPRING LOCK, S/S	
4	4	DIN 125 A	WASHER, M12 FLAT, S/S	
3	4	DIN 933	BOLT, HEX HD M12 x 25 S/S	
2	1	1180209D	ROTATING BASE	
1	1	5403/5403EG	ELECTROMAGNET, 76MM	
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE

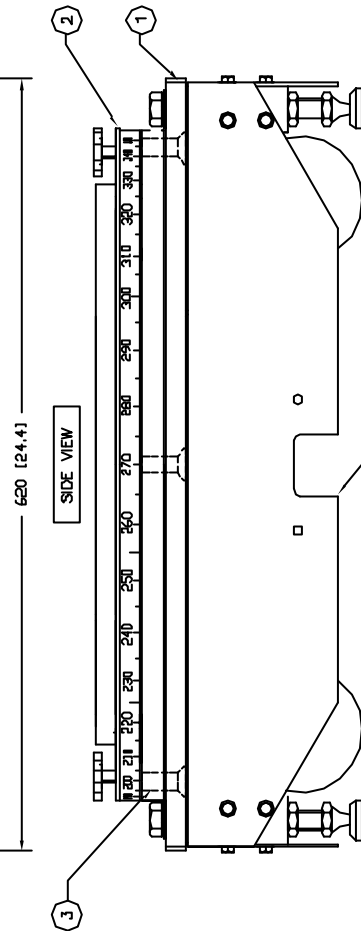
DRAWING		DATE		PARTS LIST	
G.D. LOUGHLIN	07/30/03	<div> <div>DO NOT SCALE</div> <div>FROM DRAWING</div> <div>DIMENSIONS & TOLERANCES</div> <div>(UNLESS OTHERWISE SPECIFIED)</div> </div>			
CHECK	DATE	<div> <div>LINEAR</div> <div>FRACTION</div> <div>DECIMAL</div> </div>			
ENGINEERING	DATE	<div> <div>1/16"</div> <div>1/32"</div> <div>1/64"</div> </div>			
		<div> <div>1/8"</div> <div>3/16"</div> <div>1/4"</div> </div>			
		<div> <div>1/2"</div> <div>3/4"</div> <div>1"</div> </div>			
		<div> <div>1 1/2"</div> <div>2"</div> <div>3"</div> </div>			
		<div> <div>4"</div> <div>6"</div> <div>8"</div> </div>			
		<div> <div>10"</div> <div>12"</div> <div>14"</div> </div>			
		<div> <div>16"</div> <div>18"</div> <div>20"</div> </div>			
		<div> <div>24"</div> <div>30"</div> <div>36"</div> </div>			
		<div> <div>42"</div> <div>48"</div> <div>54"</div> </div>			
		<div> <div>60"</div> <div>72"</div> <div>84"</div> </div>			
		<div> <div>96"</div> <div>108"</div> <div>120"</div> </div>			
		<div> <div>132"</div> <div>144"</div> <div>156"</div> </div>			
		<div> <div>168"</div> <div>180"</div> <div>192"</div> </div>			
		<div> <div>204"</div> <div>216"</div> <div>228"</div> </div>			
		<div> <div>240"</div> <div>252"</div> <div>264"</div> </div>			
		<div> <div>276"</div> <div>288"</div> <div>300"</div> </div>			
		<div> <div>312"</div> <div>324"</div> <div>336"</div> </div>			
		<div> <div>348"</div> <div>360"</div> <div>372"</div> </div>			
		<div> <div>384"</div> <div>396"</div> <div>408"</div> </div>			
		<div> <div>420"</div> <div>432"</div> <div>444"</div> </div>			
		<div> <div>456"</div> <div>468"</div> <div>480"</div> </div>			
		<div> <div>492"</div> <div>504"</div> <div>516"</div> </div>			
		<div> <div>528"</div> <div>540"</div> <div>552"</div> </div>			
		<div> <div>564"</div> <div>576"</div> <div>588"</div> </div>			
		<div> <div>600"</div> <div>612"</div> <div>624"</div> </div>			
		<div> <div>636"</div> <div>648"</div> <div>660"</div> </div>			
		<div> <div>672"</div> <div>684"</div> <div>696"</div> </div>			
		<div> <div>708"</div> <div>720"</div> <div>732"</div> </div>			
		<div> <div>744"</div> <div>756"</div> <div>768"</div> </div>			
		<div> <div>780"</div> <div>792"</div> <div>804"</div> </div>			
		<div> <div>816"</div> <div>828"</div> <div>840"</div> </div>			
		<div> <div>852"</div> <div>864"</div> <div>876"</div> </div>			
		<div> <div>888"</div> <div>900"</div> <div>912"</div> </div>			
		<div> <div>924"</div> <div>936"</div> <div>948"</div> </div>			
		<div> <div>960"</div> <div>972"</div> <div>984"</div> </div>			
		<div> <div>996"</div> <div>1008"</div> <div>1020"</div> </div>			
		<div> <div>1032"</div> <div>1044"</div> <div>1056"</div> </div>			
		<div> <div>1068"</div> <div>1080"</div> <div>1092"</div> </div>			
		<div> <div>1104"</div> <div>1116"</div> <div>1128"</div> </div>			
		<div> <div>1140"</div> <div>1152"</div> <div>1164"</div> </div>			
		<div> <div>1176"</div> <div>1188"</div> <div>1200"</div> </div>			
		<div> <div>1212"</div> <div>1224"</div> <div>1236"</div> </div>			
		<div> <div>1248"</div> <div>1260"</div> <div>1272"</div> </div>			
		<div> <div>1284"</div> <div>1296"</div> <div>1308"</div> </div>			
		<div> <div>1320"</div> <div>1332"</div> <div>1344"</div> </div>			
		<div> <div>1356"</div> <div>1368"</div> <div>1380"</div> </div>			
		<div> <div>1392"</div> <div>1404"</div> <div>1416"</div> </div>			
		<div> <div>1428"</div> <div>1440"</div> <div>1452"</div> </div>			
		<div> <div>1464"</div> <div>1476"</div> <div>1488"</div> </div>			
		<div> <div>1500"</div> <div>1512"</div> <div>1524"</div> </div>			
		<div> <div>1536"</div> <div>1548"</div> <div>1560"</div> </div>			
		<div> <div>1572"</div> <div>1584"</div> <div>1596"</div> </div>			
		<div> <div>1608"</div> <div>1620"</div> <div>1632"</div> </div>			
		<div> <div>1644"</div> <div>1656"</div> <div>1668"</div> </div>			
		<div> <div>1680"</div> <div>1692"</div> <div>1704"</div> </div>			
		<div> <div>1716"</div> <div>1728"</div> <div>1740"</div> </div>			
		<div> <div>1752"</div> <div>1764"</div> <div>17</div></div>			

REV	DESCRIPTION	DWPT	DATE	APPROVED
A	RELEASE		04/27/04	C.DONALDAS
B	ADD 04003 MTG HOLES		06/13/04	B.DONALDAS
C	ADD MOTORIZED ROTATING BASE HOLES		07/09/07	B.DONALDAS

FRONT VIEW



MOUNTING HOLES
A=5403 DIRECT MOUNTING
B=3473/3472 DIRECT MOUNTING
C1/C2=3472 45° MOUNTING
D1/D2=3473 45° MOUNTING
C1/C3=3472 HORIZ MOUNTING
D1/D3=3473 HORIZ MOUNTING
E=HFD SPOOL MOUNTING
F=HFD MOTOR DRIVE MOUNTING
G=5403EG DIRECT MOUNTING






CUTOUT FOR ROLLING BASE GUIDE ASSEMBLY
DWG NO 11901330

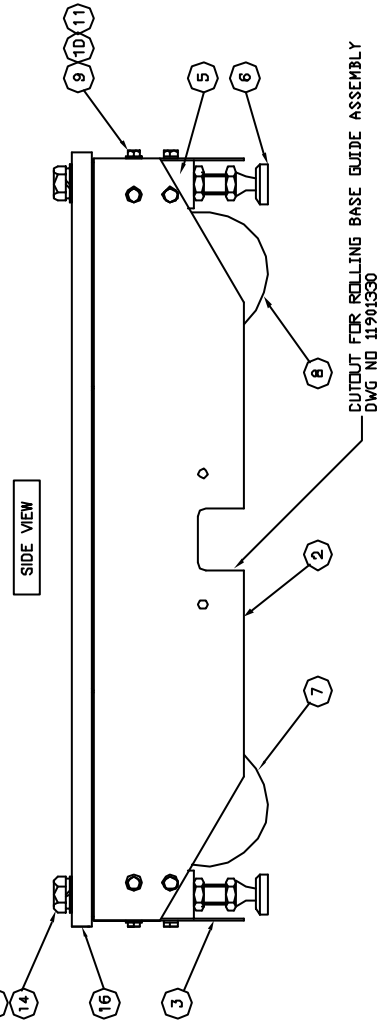
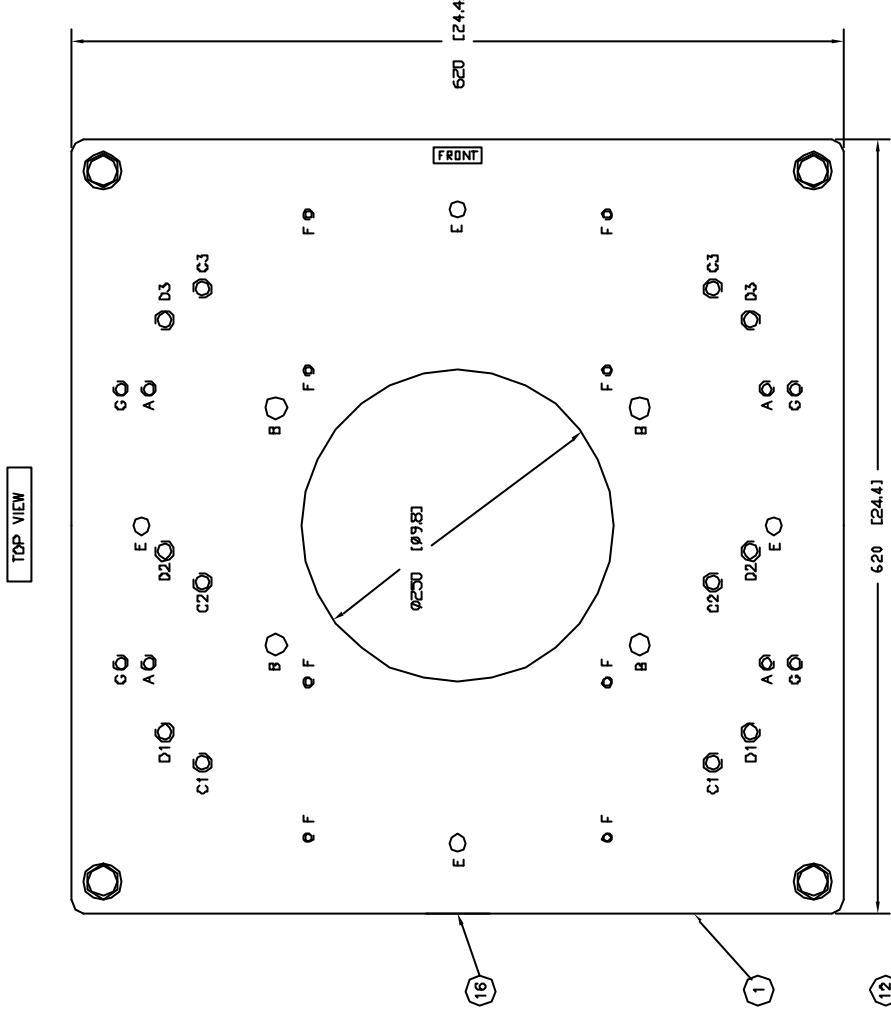
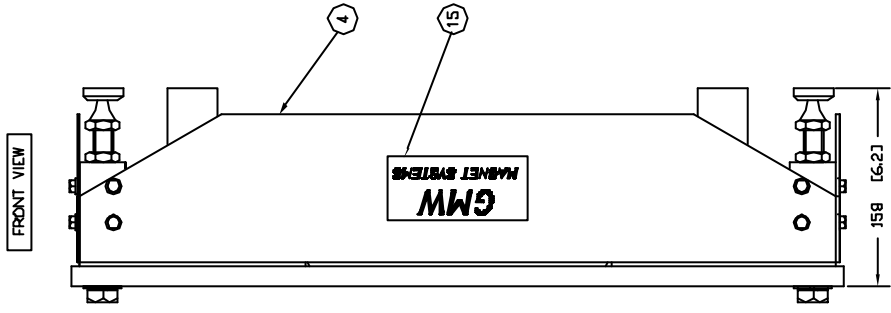
3	4	DIN 7991	SHCS, M12 X 35 FLAT HD 5/5
2	1	11802090	ROTATING BASE ASSEMBLY
1	1	11803170	ROLLING BASE ASSEMBLY
PARTS	QTY	NAME	ALGASOORDNAM
			NOZZLE

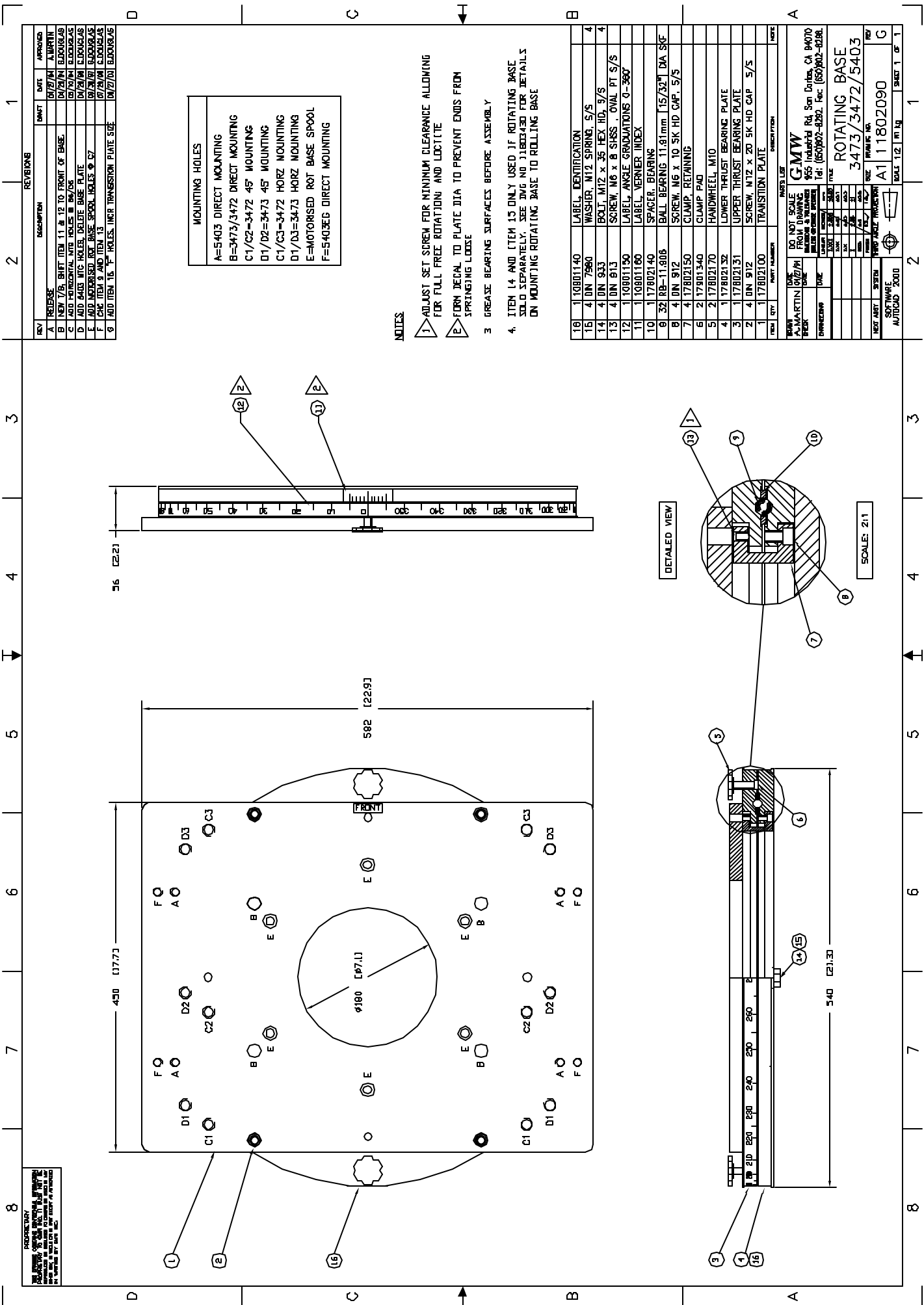
[illegible]

REVISIONS			DATE	APPROVED
REV	DESCRIPTION	DRP/PT		
A	RELEASE	10/29/13	A. KASHTIN	
B	NEW 1/8" ADD ITEM 13, WONE 2.3, SHFT "A" HOLES	10/29/13	B. DUNHAM	
C	ADD MAGNET HORIZONTAL MOUNTING HOLES	10/29/13	C. DUNHAM	
D	ADD 5/16" X 2" HOLES	10/29/13	D. DUNHAM	
E	ADD MOTOR DRIVE MOUNTING HOLES	10/29/13	E. DUNHAM	
F	ADD ITEM 16, AND 2" MAGNET HORIZONTAL MOUNTING HOLES	10/29/13	F. DUNHAM	

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
16	1	17901110	LABEL, IDENTIFICATION	
15	1	17801120	LABEL, GHW MAGNET SYSTEMS	
14	4	DIN 125 A	M16 X 3 THICK WASHER, FLAT S/S	
13	4	DIN 127 B	M16 WASHER, SPRING S/S	
12	4	DIN 833	M16 X 40 HEX HD BOLT, S/S	
11	16	DIN 127 B	M6 WASHER, SPRING S/S	
10	16	DIN 433	M6 WASHER, FLAT S/S	
9	16	DIN 933	M6 X 8 HEX HD BOLT S/S	
8	2	REX CHDS 4RT	CASTER, SWIVEL	
7	2	REX CHDF	CASTER, FIXED	
6	4	17802180	LEVELLING FOOT	
5	4	17802160	SUPPORT LEG	
4	4	17802123	SKIRT PANEL, FRONT	
3	2	17802122	SKIRT PANEL, REAR	
2	2	17802121	SKIRT PANEL, SIDE	
1	1	17802110	BASE PLATE	

DATE A. MARTIN	DO NOT SCALE FROM DRAWING				FIRST ANGLE PROJECTION	SIZE	DRAWING NO.	3473/3472/5403	TILE	ROLLING BASE ASSY	955 Industrial Rd. San Carlos, CA 94070 Tel (650)902-4920. Fax: (650)902-8796.	GMW
CHECK	DATE											
ENGINEERING	DATE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE	JANICE
		JANICE	JANICE</									





REV

DESCRIPTION

DATE

APPROVED

BY

DATE

APPROVED

BY

DATE

REV	DESCRIPTION	DATE	APPROVED
1	RELEASE	07/27/01	1.000000
2	NEW 7/8" BOLT ITEM 11 & 12 TO FRONT OF BASE	07/27/01	1.000000
3	ADD 1/2" DIA. HOLE IN BASE PLATE	07/27/01	1.000000
4	ADD 1/2" DIA. HOLE IN BASE PLATE	07/27/01	1.000000
5	ADD 1/2" DIA. HOLE IN BASE PLATE	07/27/01	1.000000
6	ADD 1/2" DIA. HOLE IN BASE PLATE	07/27/01	1.000000
7	ADD 1/2" DIA. HOLE IN BASE PLATE	07/27/01	1.000000
8	ADD 1/2" DIA. HOLE IN BASE PLATE	07/27/01	1.000000
9	ADD 1/2" DIA. HOLE IN BASE PLATE	07/27/01	1.000000

REV	DESCRIPTION	DATE	APPROVED
1	RELEASE	07/27/01	1.000000
2	NEW 7/8" BOLT ITEM 11 & 12 TO FRONT OF BASE	07/27/01	1.000000
3	ADD 1/2" DIA. HOLE IN BASE PLATE	07/27/01	1.000000
4	ADD 1/2" DIA. HOLE IN BASE PLATE	07/27/01	1.000000
5	ADD 1/2" DIA. HOLE IN BASE PLATE	07/27/01	1.000000
6	ADD 1/2" DIA. HOLE IN BASE PLATE	07/27/01	1.000000
7	ADD 1/2" DIA. HOLE IN BASE PLATE	07/27/01	1.000000
8	ADD 1/2" DIA. HOLE IN BASE PLATE	07/27/01	1.000000
9	ADD 1/2" DIA. HOLE IN BASE PLATE	07/27/01	1.000000

NOTES

1. ADJUST SET SCREW FOR MINIMUM CLEARANCE ALLOWING FOR FULL FREE ROTATION AND LOCITE
2. FORM DECAL TO PLATE DIA TO PREVENT ENDS FROM SPRINGING LOOSE
3. GREASE BEARING SURFACES BEFORE ASSEMBLY
4. ITEM 14 AND ITEM 15 ONLY USED IF ROTATING BASE SOLD SEPARATELY. SEE Dwg NO 11802090 FOR DETAILS ON MOUNTING ROTATING BASE TO ROLLING BASE

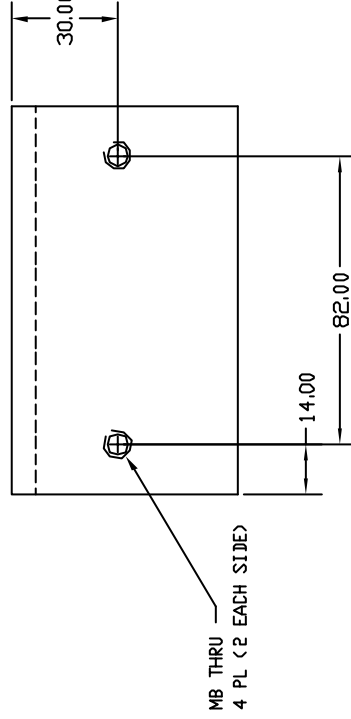
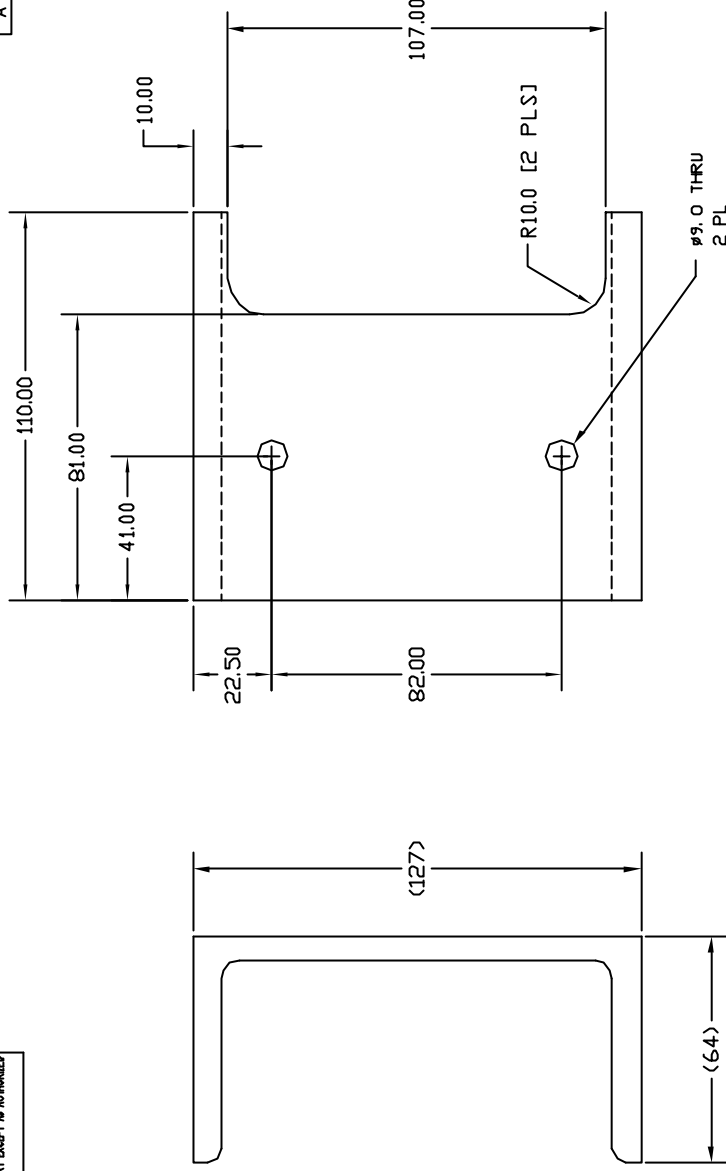
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	10801140	LABEL, IDENTIFICATION
2	1	10801140	LABEL, IDENTIFICATION
3	1	10801140	LABEL, IDENTIFICATION
4	1	10801140	LABEL, IDENTIFICATION
5	1	10801140	LABEL, IDENTIFICATION
6	1	10801140	LABEL, IDENTIFICATION
7	1	10801140	LABEL, IDENTIFICATION
8	1	10801140	LABEL, IDENTIFICATION
9	1	10801140	LABEL, IDENTIFICATION
10	1	10801140	LABEL, IDENTIFICATION
11	1	10801140	LABEL, IDENTIFICATION
12	1	10801140	LABEL, IDENTIFICATION
13	1	10801140	LABEL, IDENTIFICATION
14	1	10801140	LABEL, IDENTIFICATION
15	1	10801140	LABEL, IDENTIFICATION
16	1	10801140	LABEL, IDENTIFICATION

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	10801140	LABEL, IDENTIFICATION
2	1	10801140	LABEL, IDENTIFICATION
3	1	10801140	LABEL, IDENTIFICATION
4	1	10801140	LABEL, IDENTIFICATION
5	1	10801140	LABEL, IDENTIFICATION
6	1	10801140	LABEL, IDENTIFICATION
7	1	10801140	LABEL, IDENTIFICATION
8	1	10801140	LABEL, IDENTIFICATION
9	1	10801140	LABEL, IDENTIFICATION
10	1	10801140	LABEL, IDENTIFICATION
11	1	10801140	LABEL, IDENTIFICATION
12	1	10801140	LABEL, IDENTIFICATION
13	1	10801140	LABEL, IDENTIFICATION
14	1	10801140	LABEL, IDENTIFICATION
15	1	10801140	LABEL, IDENTIFICATION
16	1	10801140	LABEL, IDENTIFICATION

PROPRIETARY
THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION
PROPRIETARY TO GMW INC. IT MUST NOT BE
REPRODUCED OR TRANSMITTED IN ANY FORM OR
BY ANY MEANS, ELECTRONIC OR MECHANICAL,
INCLUDING PHOTOCOPYING, RECORDING, OR BY
ANY INFORMATION STORAGE AND RETRIEVAL
SYSTEM, WITHOUT THE WRITTEN PERMISSION
OF GMW INC. IN WRITING BY GMW INC.

REVISIONS

REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE, REDRAWN FROM DWG NO 17512640		07/01/03	G.DOLUGLAS

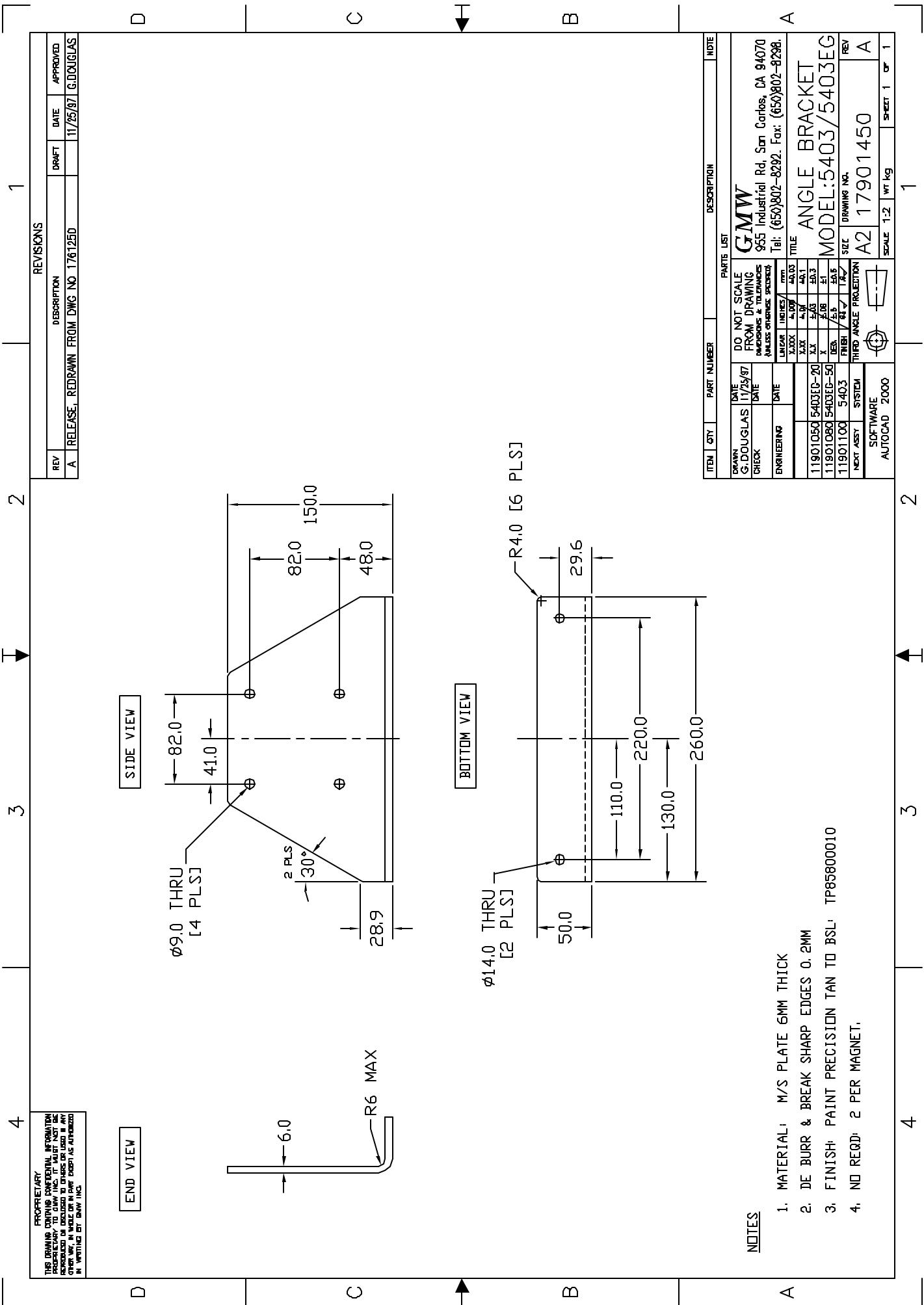


NOTES

1. MATERIAL: 127 X 63 X 15 M.S CHANNEL
2. DE BURR & BREAK SHARP EDGES
3. FINISH PAINT PRECISION TAN TO BSL, TP85800010

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				
DRAWN		DATE	DO NOT SCALE	
G.DOLUGLAS		07/01/03	FROM DRAWING	
CHECK		DATE	DIMENSIONS & TOLERANCES	
ENGINEERING		DATE	(UNLESS OTHERWISE SPECIFIED)	
			LINEAR	INCHES
			XXX	±.001
			XX	±.01
			X	±.03
			DEL	±.06
			FINISH	±.1
			SIZE	1.6
			THIRD ANGLE PROJECTION	
			SOFTWARE	
			AUTOCAD 2000	
			SCALE 1:1	WT Kg
			SHEET 1	OF 1

TITLE	VERT MTG BRK
MODEL	5403/5403EG
REV	A
DRAWING NO.	A2 17901610
GMW	955 Industrial Rd, San Carlos, CA 94070
Tel:	(650)802-8292
Fax:	(650)802-8298



PROPRIETARY
THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION
PROPERTY OF GUNW INC. IT MUST NOT BE
REPRODUCED OR TRANSMITTED IN ANY FORM OR BY
ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT
THE WRITTEN PERMISSION OF GUNW INC.

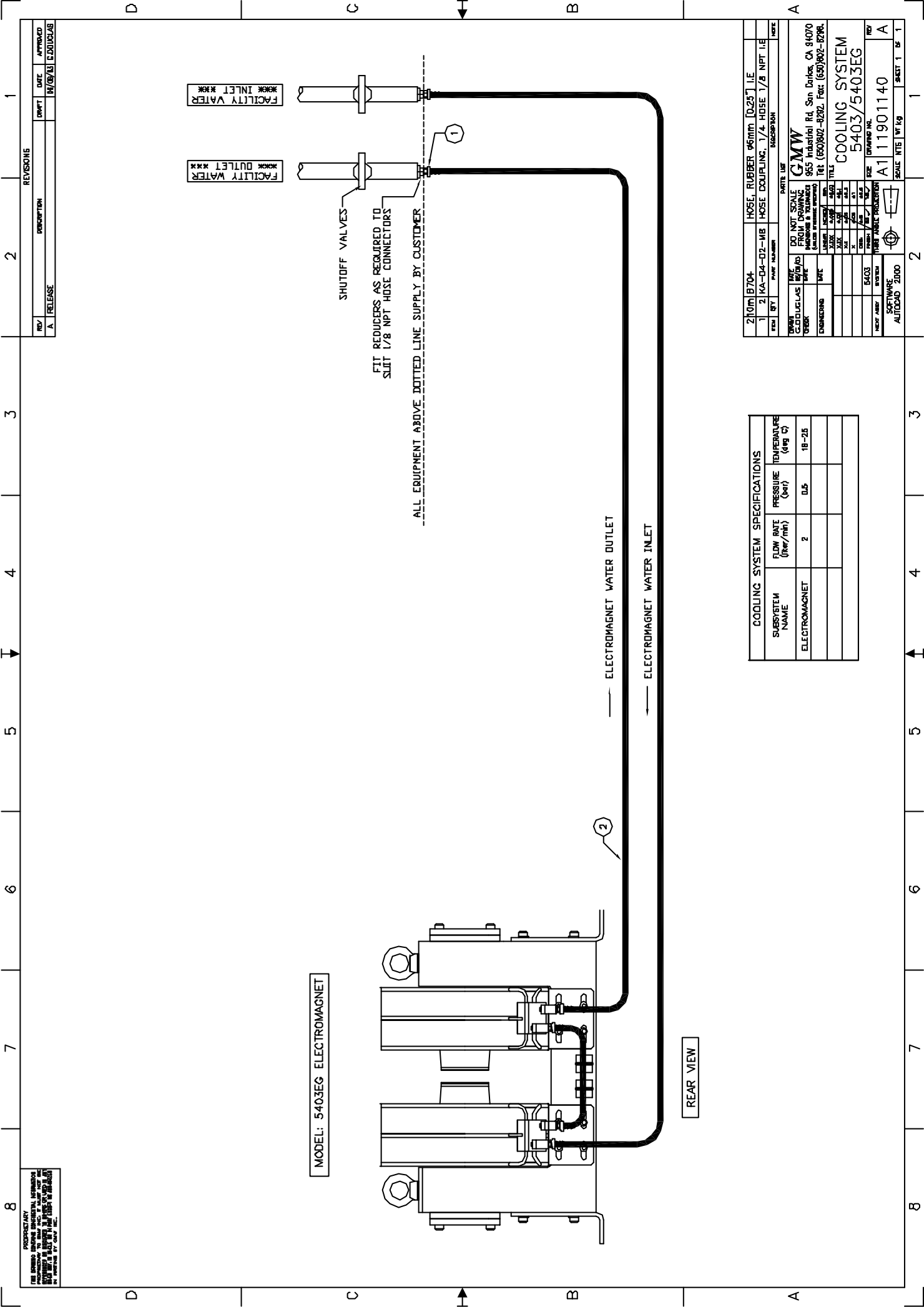
REVISIONS

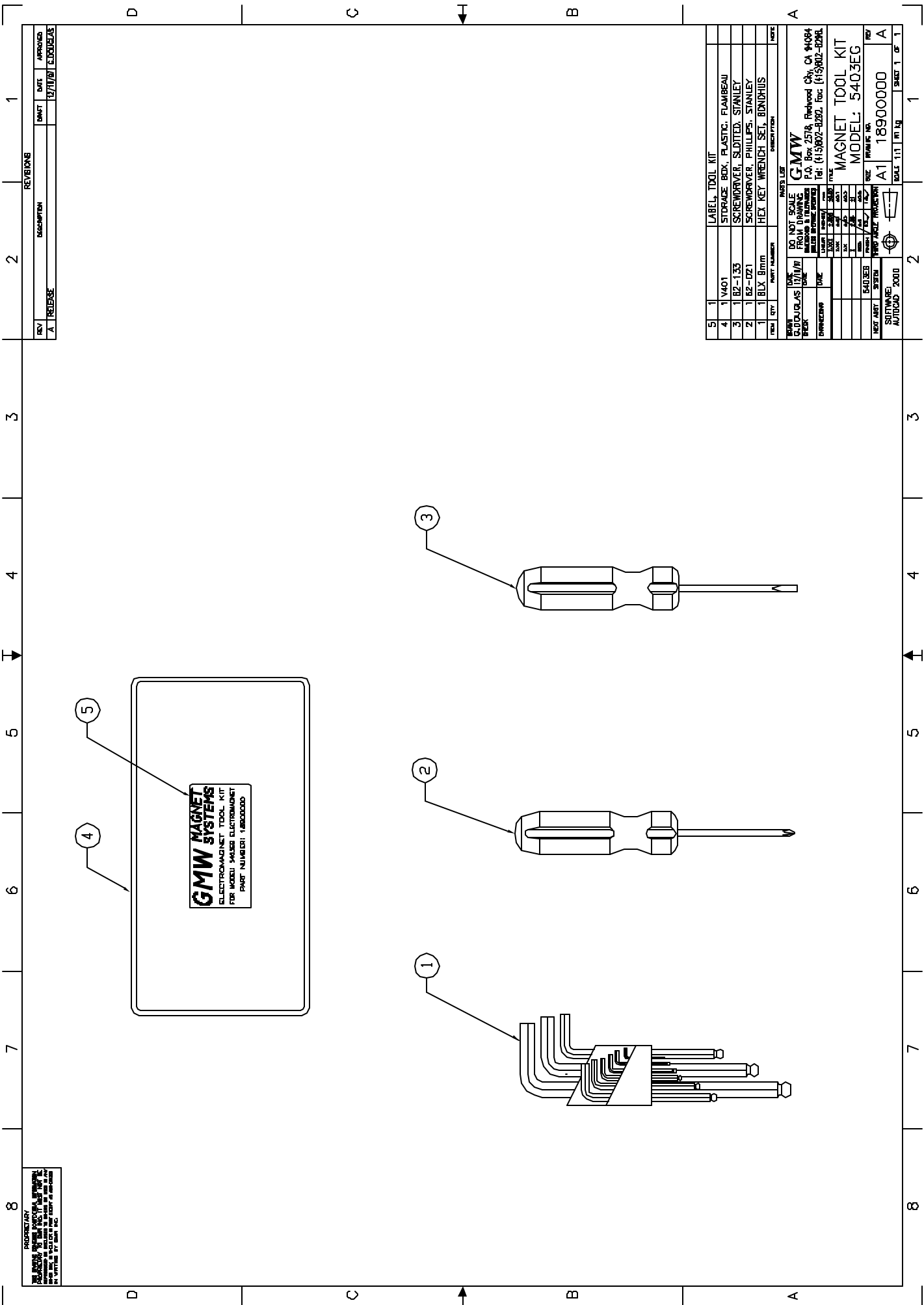
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE, REDRAWN FROM DWG NO 1761250		11/25/97	G.DOUGLAS

NOTES

1. MATERIAL: M/S PLATE 6MM THICK
2. DE BURR & BREAK SHARP EDGES 0.2MM
3. FINISH: PAINT PRECISION TAN TO BSL: TP85800010
4. NO REQD: 2 PER MAGNET.

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				
DO NOT SCALE FROM DRAWING				
UNLESS OTHERWISE SPECIFIED				
LINEAR UNITS / INCHES / mm				
TOLERANCES				
FRACTIONS				
DECIMALS				
FINISH				
THIRD ANGLE PROJECTION				
SOFTWARE				
AUTOCAD 2000				
SCALE 1:2 WT kg				
SHEET 1 OF 1				
G.M.W. 955 Industrial Rd, San Carlos, CA 94070				
Tel: (650)802-8292. Fax: (650)802-8298.				
TITLE				
ANGLE BRACKET				
MODEL: 5403/5403EG				
SIZE				
DRAWING NO.				
A2 17901450				
REV				
A				





REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	RELEASE	12/17/99	C.DONOHUE

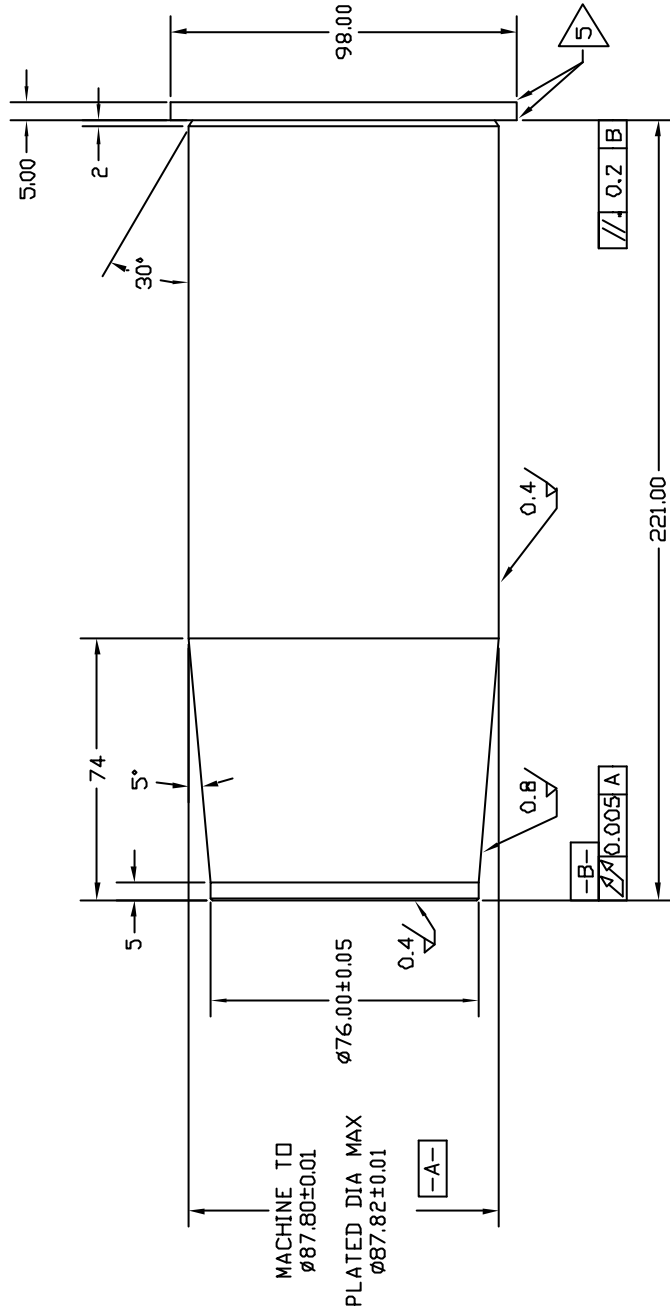
PARTS LIST		DESCRIPTION	
5	1	LABEL, TOOL KIT	
4	1	STORAGE BOX, PLASTIC, FLAMBEAU	
3	1	SCREWDRIVER, SLUTTED, STANLEY	
2	1	SCREWDRIVER, PHILLIPS, STANLEY	
1	1	HEX KEY WRENCH SET, BONDHUIS	
ITEM	QTY	PART NUMBER	NOTE
DO NOT SCALE			
PART NUMBER			
ELECTROMAGNET TOOL KIT			
FOR MODEL 5403EG ELECTROMAGNET			
PART NUMBER: 18900000			
GMW MAGNET SYSTEMS			
P.O. Box 2578, Redwood City, CA 94064			
Tel: (415)802-8282, Fax: (415)802-8286			
MAGNET TOOL KIT			
MODEL: 5403EG			
PART NUMBER: 18900000			
SCALE: 1:1			
SHEET 1 OF 1			


PROPRIETARY
ALL RIGHTS RESERVED
NO PART OF THIS DOCUMENT
IS TO BE REPRODUCED OR
TRANSMITTED IN ANY FORM
OR BY ANY MEANS, ELECTRONIC
OR MECHANICAL, INCLUDING
PHOTOCOPYING, RECORDING,
OR BY ANY INFORMATION
STORAGE AND RETRIEVAL
SYSTEM, WITHOUT PERMISSION
IN WRITING BY GMW, INC.

PROPRIETARY

THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION PROPRIETARY TO GMW INC. IT MUST NOT BE REPRODUCED OR DISCLOSED TO OTHERS OR USED IN ANY OTHER WAY, IN WHOLE OR IN PART EXCEPT AS AUTHORIZED IN WRITING BY GMW INC.

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/25/87	G.DOUGLAS
B	CHG FLANGE AND TAPER OF POLE		12/15/87	G.DOUGLAS
C	CHG DIAMETER OF POLE @ C4		03/08/98	G.DOUGLAS

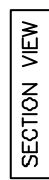


- NOTES:
1. MATERIAL: 1008 LOW CARBON STEEL
 2. MATERIAL MUST BE CUT WITH THE AXIS OF THE RUNNING IN THE SAME DIRECTION AS THE RAW PLATE GRAIN
 3. ROUGH MACHINE THEN ANNEAL TO BSL: TP85800040
 4. FINISH: E,N PLATE 0.01MM THICK TO BSL TP85800120
 5.  BREAK ALL SHARP EDGES 0.2MM.
 6. NO REQD: 2 PER MAGNET

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				
DRAWN G. DOUGLAS	DATE 11/25/97	DO NOT SCALE FROM DRAWING (DIMENSIONS & TOLERANCES UNLESS OTHERWISE SPECIFIED)		
CHECK	DATE			
ENGINEERING	DATE			
		LINEAR	INCHES	MM
		X-XXX	X-XXX	X-XXX
		X-XX	X-XX	X-XX
		X-X	X-X	X-X
		X	X	X
		DEB	DEB	DEB
		FINISH	FINISH	FINISH
		THIRD ANGLE PROJECTION		
NEXT ASSY	SYSTEM			
SOFTWARE				
AUTOCAD	2000			

REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/24/87	G. DOUGLAS
B	CHANGE HOLE SIZE & TOL		05/01/02	G. DOUGLAS
C	ADD NOTE: 5		08/09/03	G. DOUGLAS

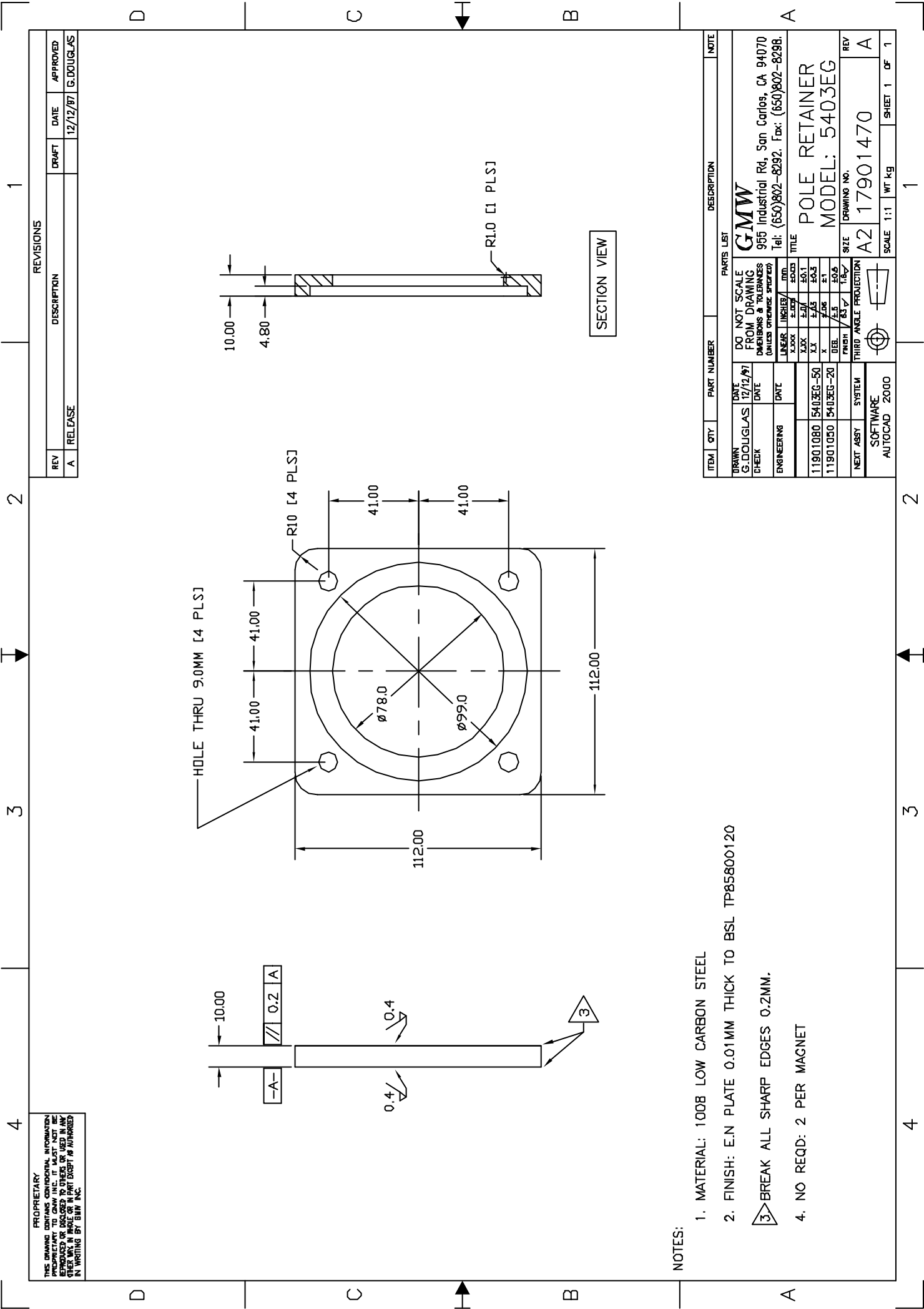
REVISIONS				
REV	DESCRIPTION	DRAFT	DATE	APPROVED
A	RELEASE		11/24/87	G. DOUGLAS
B	CHANGE HOLE SIZE & TOL		05/01/02	G. DOUGLAS
C	ADD NOTE: 5		08/09/03	G. DOUGLAS



- NOTES:
1. MATERIAL: 1008 LOW CARBON STEEL
 2. FINISH: E.N PLATE 0.01MM THICK TO BSL TP85800120
 3. BREAK ALL SHARP EDGES 0.2MM.
 4. NO REQD: 2 PER MAGNET
 5. SPACER THICKNESS SPECIFIED BY PART NO SUFFIX.
10mm THICK SPACER = PART NO 17901400-10
12.5mm THICK SPACER = PART NO 17901400-12.5


ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				
DRAWN G. DOUGLAS	DATE 11/24/97	DO NOT SCALE		
CHECK	DATE	FROM DRAWING		
ENGINEERING	DATE	DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)		
		LINEAR	INCHES	MIL
		X-XXX	X-XXX	X-XXX
		X-XX	X-XX	X-XX
		X-X	X-X	X-X
		X	X	X
		DEC.	±.5	±.1
		FINISH	±.5	±.1
		THIRD ANGLE PROJECTION	1/8"	1/8"
NEXT ASSY	SYSTEM	REV		
SOFTWARE		A2		
AUTOCAD	2000	17901400		
		MODEL: 5403EG		
		POLE SPACER		
		955 Industrial Rd, San Carlos, CA 94070		
		Tel: (650)802-8292. Fax: (650)802-8298.		
		TITLE		
		SCALE 1:1		
		WT kg		
		SHEET 1 OF 1		

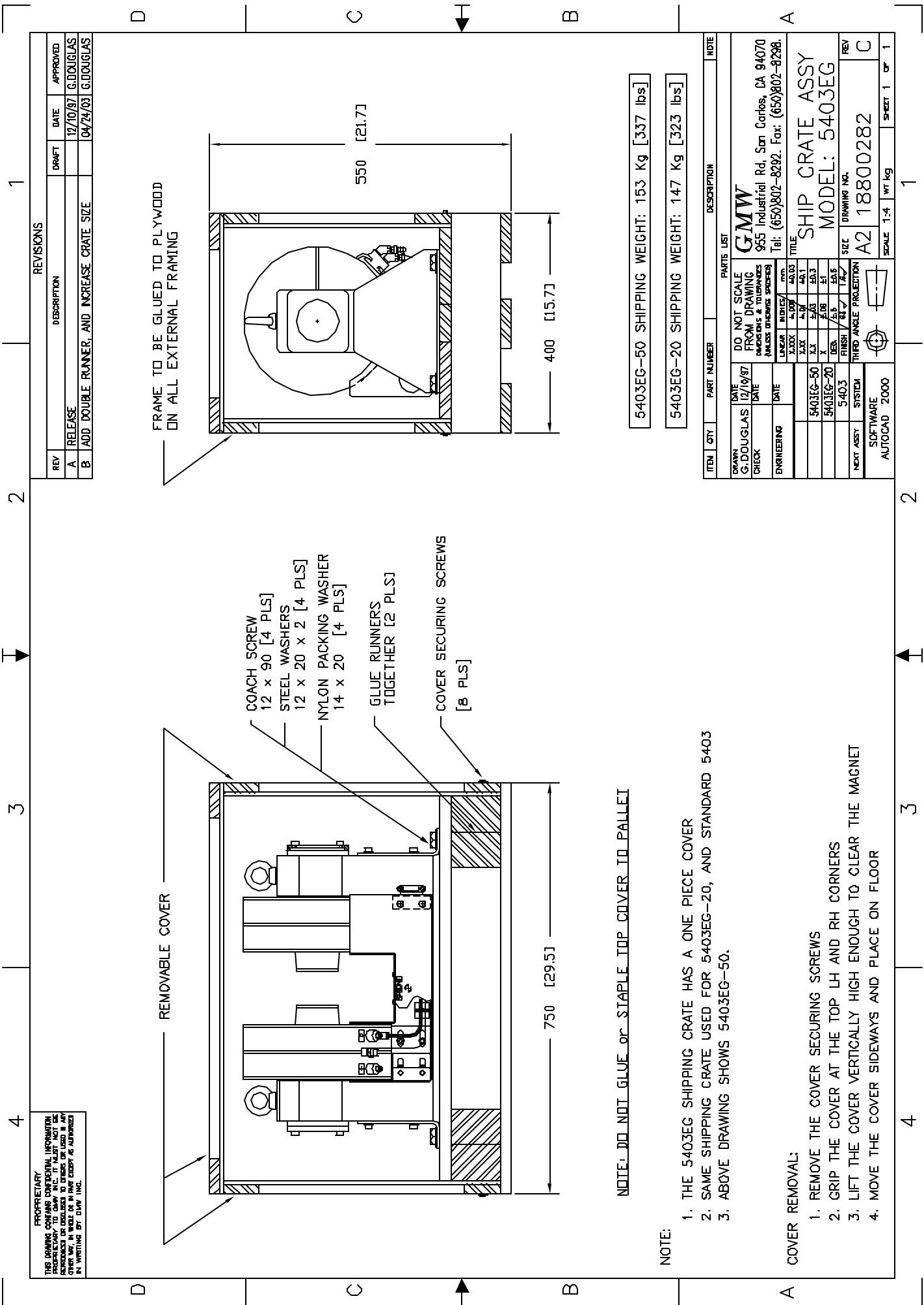
ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				
DRAWN G. DOUGLAS	DATE 11/24/97	DO NOT SCALE		
CHECK	DATE	FROM DRAWING		
ENGINEERING	DATE	DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)		
		LINEAR	INCHES	MIL
		X-XXX	X-XXX	X-XXX
		X-XX	X-XX	X-XX
		X-X	X-X	X-X
		X	X	X
		DEC.	±.5	±.1
		FINISH	±.5	±.1
		THIRD ANGLE PROJECTION	1/8"	1/8"
NEXT ASSY	SYSTEM	REV		
SOFTWARE		A2		
AUTOCAD	2000	17901400		
		MODEL: 5403EG		
		POLE SPACER		
		955 Industrial Rd, San Carlos, CA 94070		
		Tel: (650)802-8292. Fax: (650)802-8298.		
		TITLE		
		SCALE 1:1 WT kg		
		SHEET 1 OF 1		



NOTES:

1. MATERIAL: 1008 LOW CARBON STEEL
2. FINISH: E.N PLATE 0.01MM THICK TO BSL TP85800120
3. BREAK ALL SHARP EDGES 0.2MM.
4. NO REQD: 2 PER MAGNET

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				
DRAWN	DATE	DO NOT SCALE FROM DRAWING DIMENSIONS & TOLERANCES (UNLESS OTHERWISE SPECIFIED)		
G. DOUGLAS	12/12/97			
CHECK	DATE			
ENGINEERING	DATE	LINEAR	INCHES	MM
		X.XXX	±.001	±.003
		X.XX	±.01	±.01
		X.X	±.03	±.03
		X	±.06	±.1
		Ø	±.5	±.06
		FINISH	AS F	1.6
NEXT ASSY	SYSTEM	THIRD ANGLE PROJECTION		
SOFTWARE				
AUTOCAD 2000				
SCALE		1:1	WT kg	SHEET 1 OF 1
REV		A2	17901470	A
DRAWING NO.				
MODEL: 5403EG				
POLE RETAINER				
G.M.W.				
955 Industrial Rd, San Carlos, CA 94070				
Tel: (650)802-8292. Fax: (650)802-8298.				
DATE				
12/12/97				
DRAFT				
12/12/97				
APPROVED				
G. DOUGLAS				



PROPRIETARY
THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION
PROPRIETARY TO GUNW INC. IT MUST NOT BE
REPRODUCED OR DISCLOSED TO OTHERS OR USED IN ANY
MANNER WITHOUT THE WRITTEN CONSENT OF GUNW INC.
IN WRITING BY GUNW INC.

REVISIONS			
REV	DESCRIPTION	DRAFT	DATE
A	RELEASE		12/10/97 G.DOUGLAS
B	ADD DOUBLE RUNNER, AND INCREASE CRATE SIZE		04/24/03 G.DOUGLAS

NOTE: DO NOT GLUE OR STAPLE TOP COVER TO PALLET

- NOTE:
1. THE 5403EG SHIPPING CRATE HAS A ONE PIECE COVER
 2. SAME SHIPPING CRATE USED FOR 5403EG-20, AND STANDARD 5403
 3. ABOVE DRAWING SHOWS 5403EG-50.

COVER REMOVAL:

1. REMOVE THE COVER SECURING SCREWS
2. GRIP THE COVER AT THE TOP LH AND RH CORNERS
3. LIFT THE COVER VERTICALLY HIGH ENOUGH TO CLEAR THE MAGNET
4. MOVE THE COVER SIDEWAYS AND PLACE ON FLOOR

5403EG-50 SHIPPING WEIGHT: 153 Kg [337 lbs]

5403EG-20 SHIPPING WEIGHT: 147 Kg [323 lbs]

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
PARTS LIST				
DO NOT SCALE FROM DRAWING UNLESS DIMENSIONS ARE SHOWN IN PARENTHESES				
DATE	12/19/97	DATE	12/19/97	DATE
ENGINEERING		DATE		DATE
SHIP CRATE ASSY MODEL: 5403EG				
DRAWING NO. A2 18800282				
SCALE 1:4 WT kg SHEET 1 OF 1				

GUNW
955 Industrial Rd, San Carlos, CA 94070
Tel: (650)802-8292. Fax: (650)802-8298.